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# THE BUILDING NEWS

AND

ENGINEERING JOURNAL.

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VOLUME THE FIFTY-FIFTH.

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JULY TO DECEMBER, 1888.

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PUBLISHED (FOR THE PROPRIETORS) BY E. J. KIBBLEWHITE,

THE OFFICE OF THE "BUILDING NEWS,"

332, STRAND, LONDON, W.C.



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# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

### SCALE.

WE are not about to speak of the scales used in drawing, but of that measure of proportion between the parts of a design by which the eye is apt to judge of the size of a building. If we take three isolated buildings of equal elevation and width, and divide one of them into two parts or stories, another into three stories, and the third into four stories, the impression on our minds will be that the four-storied house is the highest and largest, the three-story one is less large, and the two-story building the smallest, as the eye is disposed to measure the height by the number of divisions, and not by the actual dimensions. Place them together, and the eye immediately perceives the equality of the height, though the width of the four-storied building looks the greatest. This kind of optical phenomenon is of a relative kind. The only absolute scale we have to go by is the height of the human figure, and it is this alone by which we can measure mentally the height or size of a building. The parts of a great building are larger than those of a small one; the stories, or horizontal divisions, are higher—hence the eye is frequently misled by the real dimensions of a great edifice. We have all heard of the singular want of scale to be found in St. Peter's at Rome, where the colossal single order deceives the eye, and the large scale of sculptured figures on the interior piers reduces amazingly to the eye the real size of the interior. The impression of magnitude is not felt. Till the visitor actually stands beneath the great vault of nave or measures himself next one of the colossal piers or the moulded bases of the pilasters, he has no idea of the vastness of the building. The same wonder is excited, though in a less marked degree, when we view any large-featured edifice from a distance, and then go up to it or enter it. Who has not been surprised at the height and size of the columns which adorn the colonnade of the British Museum, when he ascends the steps of the portico? In the street opposite, the colonnade looks long and low, and the actual magnitude of the front cannot be estimated till one actually goes up and stands under the portico, or observes the height of a man near the columns. The surprise would not be so great were we to see the front divided into three or four stories, for then the eye could estimate at once the actual dimensions both of length and height. The west front of St. Paul's looks majestic at a distance, because it has, instead of one colossal, two orders of columns, and it has other buildings near it from which we can judge of its relative size. The vastness of a simple-lined structure like the Pyramids, is lost in the boundless open area of the desert, so if we were to drop a single—"order" edifice like the British

Museum, down into an open waste, it, too, would appear small comparatively, till we were actually close beside it. The lesson we have to draw from these parallels is of importance to the architect. Great size in building may be lost to the thousands who never enter the building when it is situated in a large and unconfined space of ground with nothing near it to give scale. Is it preferable that a public building should be imposing only when we enter it, that it should then overawe us by its magnitude—or should it appear great to the thousands that see it at a distance? Upon this question will depend the answer, Whether it is better to magnify the size of the parts, or to multiply and subdivide them? Which is the most allowable form of creating an architectural impression—by making the units large and few, or by multiplicity of small parts?

We may mention many examples of both of these forms. The Greek temple was an exemplification of the first; the column with its base and capital became the unit of measurement, in the modern city building we find the other principle—namely, division—carried out. One modern edifice illustrates the latter modes of proportion—namely, the Houses of Legislature, and perhaps it would be difficult to find another great work in which the division of parts is carried to a greater extent, or one that tends to the defect of littleness and fritter. Certainly that building, noble as are its masses and outline, is spoilt by multiplicity of division, and is an instructive example of ordinary sized apertures applied to a large edifice. Still the houses would lose in apparent extent if a larger unit-division or bolder detail had been employed. The greater parts of the river front are estimated by these bays; but the panelling looks small and far too delicate for a great front. The eye is distracted with repetition of panel and bay. However beautiful in design, the scale of the detail is more suited for a college quadrangle or a private residence than a large public edifice. Every building needs a certain scale of its own. What makes a fair window-opening to a private house is much too small for a building with large rooms and greater dimensions—a town-hall, for example, and after all said, the only standard of scale is the use which the building is intended to serve. It would be odd, for example, to see a municipal building pierced by windows of the same size as those of an ordinary dwelling, or to make a number of small openings to light a public hall. The size of windows in every case ought to be proportioned to the function of the room. In some large buildings, and notably the huge blocks of workmen's dwellings, this rule cannot be obeyed; hence we have the unsightly rows of small windows on every story. The

rooms are of small size, and are repetitions on each floor. The Peabody Dwellings afford us instances of a multiplication of small windows. A little architectural arrangement would have grouped the windows together on some floors so as to have given some variety to the apertures without sacrificing the scale of the building. We refer to the window, as it is in many buildings the chief unit of scale by which the real extent of the structure can be judged by the eye. The doorway is another great unit of scale. How large it should be in any given building is a question that must solely be determined by the considerations of function and architectural dignity, which may cause it to vary from the dimensions of stately portals, like that of Rheims or Chartres, to an insignificant opening, only large enough to admit two or three persons at a time. We may not then with any exactitude look upon the doorway as invariably being a unit of measurement to the eye. The great French cathedrals, with their noble façades, might have looked larger if it had not been for the grand triple doorways which adorn their west fronts; but certainly they would have lost in importance and dignity by smaller doorways. We now measure the real dimensions of those doorways by their proximity to the dwellings which surround them, which in some instances cling to their walls; or by the serried rows of statues of saints and martyrs which tenant the members of their arches and jambs. When the visitor gets close enough to realise the heights and grand scale of these portals, their stately arches and sculptured tympanæ, he begins to be overawed by their size. A very instructive instance of the effect of scale is afforded by the west front of Wells Cathedral. Has the reader ever noticed the very small and insignificant proportions of the doorways to the nave and aisles? Beautiful in detail and proportions, they are exceedingly small for the other features of this front. They certainly give real scale to the edifice, but they are not grand enough for the rest of the front. They show exactly the opposite treatment to that adopted by the Frankish architects. At Peterborough vastness is given to the west front by the grand portal of three lofty arches, in this respect rivaling its Continental sisters. Scale in this instance is obtained only by comparing the real doorways and the inclosed galilee or porch.

Attention must be drawn to the details to realise the real size. But there is a grandeur in the design which gives it a unique interest amongst cathedral churches everywhere. In the sculptured Salisbury screen front we have, on the other hand, subdivision carried to a great extent in the



tiers of sculptured figures. They give a real scale to the proportions, though there is a sacrifice of nobility. We learn from all these and other examples that scale can be obtained in other ways than by making small doors and windows and niches. We may have grand portals and divisions, but these may be subdivided by smaller features. We need not sacrifice breadth or sublimity in our great buildings—by all means let us have noble proportions of windows and doorways; but let us take care to express scale by detail, by subdivision of wall surface, as the old architects seldom failed to do. Scale must be indicated. If a design is broken up into a few great parts, we must take care to give them effect by introducing smaller breaks, niches, panels, or figure sculpture, and such markings by horizontal lines as will indicate some unit—namely, the proportions of the human figure. We must avoid making the columns too big without fluting them, window openings too great in width and height without subdivisions by mullions or tracery, or doorways without dividing them by pillars. Even the large wall surfaces can be subdivided by ornament, sculpture, or even by rustications and quoins. And one word of advice is necessary to those who think boldness a virtue in every position. The lower or entrance story of a building should, in its subdivisions and details, bear a definite relation to the human figure, even if in the upper stories greater boldness of dimension prevail.

#### BUILDERS' MORTGAGES.

THE many risks that are run by those who lend their money upon leasehold properties have often been shown in our Courts, and the soundness of these securities has frequently been much shaken. Losses have occurred to the lenders in various ways through the fraud of the borrowers, and the question which of two innocent parties must bear that loss has been made the subject of constant litigation. A novel and ingenious form of fraud was disclosed in the case of "Union Bank of London v. Kent and Others" (*Times*, 23rd June), which has just been decided by the Court of Appeal, and which is of much general interest and importance, especially as it proceeds upon facts which may every day be repeated with similar results. The plaintiffs were mortgagees of a building agreement upon which they had advanced money. It was a term of this mortgage that the mortgagors should proceed to apply to the freeholders and granters of the building agreement for proper leases, and that, having obtained them, they should mortgage those leases to the plaintiffs by way of demise, and so complete their security over the property by giving them, in effect, the legal estate; but the mortgagors having obtained the leases in their own names from the freeholders, forthwith deposited the same with Messrs. Brown, Jansen and Co., the bankers, who were the defendants in this action, to secure advances, of course concealing the prior mortgage of the property upon the building agreement to the plaintiffs. Thus the question arose, Which of these two mortgagees should take priority, or, in other words, which of these two innocent parties should bear the loss occasioned by the fraud of the mortgagors? They had both acted *bonâ fide*, and it was not easy to see what more either could have done in the way of precaution and inquiry, having regard to the common usages of bankers and men of business, who cannot be expected to foresee every possible contingency. It was contended for the plaintiffs that they were entitled to priority on the ground that their mortgage was prior in date to the defendants, and that they had not lost their equitable right to priority by any act of negligence on their part. The defendants submitted that

the plaintiffs, to have perfected their security, should have given notice of the mortgage of the building agreement to the freeholders, who, in that case, should have abstained from granting the leases, and that by omitting to give this notice they were guilty of negligence, and thus they lost their rights of priority as first mortgagees, and ought to be postponed to the defendants, who were mortgagees of the legal estate.

At the trial in the court below, however, Mr. Justice Chitty gave judgment for the plaintiffs, declining to adopt the defendants' argument as to the duty of the plaintiffs in regard to notice. He pointed out that the plaintiffs' agreement with the mortgagors was that these, as the borrowers, should obtain the legal estate themselves—i.e., should obtain the leases in their own names. The mortgage stipulated that the mortgagors having so obtained the leases should mortgage them in due legal form, by way of demise or under-lease to the plaintiffs, in order to complete their security. The mortgage was not to be by way of assignment, for that would have made the plaintiffs liable upon all the lessee's covenants, but by way of demise or under-lease, when such liability would be evaded. It followed from this arrangement that it was essential that the mortgagors should first obtain the leases in their own names, before they could grant the mortgage by way of under-lease. As a consequence of their position, notice to the freeholders not to grant the leases would have defeated the whole plan, and would have prevented the plaintiffs from ever completing their security if that notice had been effectual. But, in truth, it would probably have been as useless as it was unnecessary, for the freeholders would not have been in any way bound by the notice, or obliged to recognise the existence of the mortgage of the agreement, and they would have been entitled, if not compelled, to grant the leases to the builders and mortgagors in accordance with the agreement made for that very purpose.

The Judge, acting upon this view of the rights and duties of the plaintiffs, held that the legal estate possessed by the defendants was no protection against the plaintiffs' prior equity, because there had been no negligence on the part of the first mortgagees by which the claim based upon their priority could be defeated. He laid it down generally that in regard to charges of land, priority of security did not depend upon notice, although in some cases of contract it might be necessary to give such notice to the holder of the legal estate in order to prevent its being conveyed away. But that rule could not apply to this case, or any similar one, because the legal mortgagees had no right to intercept the legal estate, the creation of which, in their mortgagors was in fact necessary to enable them to obtain that completion of their security for which their mortgage provided.

In the Court of Appeal this judgment was supported, although partly upon somewhat broader grounds. The question was there put as being whether the defendants, being holders of the legal estate without notice, were entitled to take priority over the earlier equitable charge of the plaintiffs, which, of course, comes to the same thing. The defendants, in short, really relied upon the fact that they had obtained possession of the actual leases granted to the mortgagors as security for their advances. But the Lords Justices pointed out that this was not enough to give them the title they claimed. In order to oust the earlier mortgage of the plaintiffs, it must be shown by the defendants that their possession of the leases, by means of which they were defrauded out of their money, arose from some default or negligence on the part of the first mortgagees. The only negligence alleged against them was their omission to give notice of the mortgage of

the building agreement to the freeholders or lessors. It was urged that if such a notice had been given the lease would not have been handed over to the mortgagors without inquiry. But the Court of Appeal held it to be a well-established rule that notice was not necessary to perfect a security of this character, and they thought that it would be introducing a dangerous novelty if the defendants' view of the matter were adopted. Notice was, of course, required in some cases, different from the present, and the Court finally held that the plaintiffs, as first mortgagors, could not be postponed to the defendants' later mortgage, merely because the latter had obtained possession of the leases, and the former had not given that notice which was not legally necessary, and to which the freeholders need not have paid any attention. The result of this judgment is to show that lending money upon building agreements and building leases is but a risky business. Where an advance is made upon a building agreement, subject to the mortgagor's covenant to complete the security, when he gets his leases, it would be as well, if possible, to give notice to the freeholder with a view to finding out when these leases are granted. Difficulties will often arise in doing this, because the builder will not like his credit to be damaged. But it is obvious that though in this case the first mortgagees succeeded, in another where the facts were even slightly different, notice might be deemed necessary. As to lending money upon the actual leases themselves, as the defendants did here, it is difficult to see how all risk of prior charges can possibly be guarded against. Fraud cannot always be presumed or prevented. But, in truth, the only real remedy for this state of things is to be found in such a system of compulsory registration as will enable every prior charge upon property to be discovered by simply searching at an office.

#### FRONTAGES OF CORNER BUILDINGS.

WE have lately heard a good deal more than is agreeable as to how the law of building lines and other matters has been administered in the Metropolis. Since certain disclosures, it is now not very remarkable why one building should have been kept back and another brought forward, and why an irreconcilable difference of rules exists as to building generally. We have often asked how these things were, and expressed our astonishment at the laxity of administration exhibited. People wondered, but builders who were adepts in the mysteries of Metropolitan building law knew that the Building Acts could be set aside whenever certain authorities so ruled. We have before called attention to the infringements of public rights, and the rule as to corner houses. As our readers who have studied the question are aware, some difficulty has arisen as to what lines of frontage a corner house is to keep. The latest legal decision is the De Vere-gardens (Kensington) case, in which the Court of Appeal overruled the Vice-Chancellor and upheld the magistrates' order for the demolition of the side front, which was in advance of the general line as defined by the superintending architect. By this decision the flank wall of a corner house is to be set back to the general line unless the Metropolitan Board of Works give their consent to an advanced line. The consent of the Board has been obtained in many instances, but greatly to the prejudice of the public and adjoining owners. In our last issue we gave an important comment on this case by Lord Herschell, made before the Commission of Inquiry now sitting on the Board of Works. He therein observes:—"I think if the judgment (De Vere-gardens case) is carefully examined, it will be found that more than one, if not all, of the lords



who delivered judgment in that case expressly pointed out that a house might be in more than one row for the purpose of fixing the building line, and I do not think that any of them rested their judgment in the slightest degree on the fact as to its being the front of the house or the side of the house that was in De Vere-gardens. I should say most emphatically in my view it would not make the slightest difference whether it flanks or fronts. The building cannot come out beyond the row of houses in which it stands because it is the corner of a street and fronts into a side street, and the flank only comes out. It would be, in fact, the most objectionable form of projection." We have here an important construction on the case that is not in accord with the opinion held by many, that the decision applied to corner buildings which fronted a side street. The point is here at least established that a corner house must be regulated by the general line of frontages of both streets. In one of the reported cases, the magistrate decided that in the matter of a shop erected at the corner of two roads in advance of the line of one of them, it was not necessary that the builder should conform to the line in the side road. A contrary case may be mentioned. A corner plot of ground is let on lease, having a frontage to two roads—one of them a main road, and the other a side road. On the opposite side of the latter road is a house extending to the pavement, the others set back some feet. A building is erected on the corner plot, and the vestry compelled the builder to set back the side frontage to a line fixed by the architects of the Metropolitan Board on their application. This line had the effect of materially narrowing the frontage. The question whether the side frontage of a house should conform to the line of fronts in the road is a disputable point. Some of the magistrates have ruled that if a building is situated in the main road it is not necessary that it should be in a line with houses in the side street, a decision which has allowed houses to be erected to the detriment of owners of property adjoining. The 75th section of the Metropolitan Management Act empowers the Metropolitan Board or their architects to decide the general line of buildings in any street, place, or row of houses; but, unfortunately, consent is too often granted to override this decision, and there is no appeal. There are, it is true, certain rules to be observed, intended to protect the adjoining owners, one of which is that persons interested are to be heard by the superintending architect.

We think it is desirable that all corner sites should be staked out by the authorities as soon as new buildings are contemplated, so that the frontage lines may be understood. It is evident that the purchaser or lessee of a corner plot may be a loser when both frontage lines are set back to a general line. The effect, for instance, of setting back, say, 10ft. on one front, and 5ft. on the other, would be to curtail the area of an ordinary house 450 to 500ft., or at least half. Yet the corner house becomes a guide to houses in both streets, and its influence for good or bad must be felt. Under these circumstances, the decision laid down in the De Vere-gardens case, and interpreted by Lord Herschell, is of great significance to lessees. All that is needed is an impartial administration of the provisions of the Act. Great injustice is done to owners of houses by consent being given to allow a frontage to stand out several feet in advance of buildings on either side of it. The adjoining owners are sometimes apathetic, and allow the building to obstruct their view before they begin to find out a serious injury has been inflicted on them; they then begin to protest, but it is too late. The height to

which buildings in the Metropolis can be built is also governed more by consent than law, as we lately pointed out, and we hope the proposal to give the London Council powers to restrict the excessive height of buildings in existing streets will be carried. There is now no power to limit height.

#### THE METROPOLITAN BOARD OF WORKS INQUIRY.

THE Royal Commissioners continued their investigations into the proceedings of the Metropolitan Board of Works at the Westminster Sessions House on Friday.

Mr. Richard Frost stated that he was removed from the Crown public-house in Soho in consequence of its being taken by the Metropolitan Board of Works. He received compensation. After he went out the premises remained standing and occupied for two years.

Mr. G. T. Brain said he was formerly a tenant of the Beaufort Arms public-house, Beaufort-street, Chelsea. Subsequently the house was taken over by the Board, and witness received £5,000 as compensation. The house was, he believed, open still.

Mr. Frederick Gannaway, the present tenant of the Beaufort Arms, stated that he had occupied the premises since the last witness gave up possession. He had made various payments, under pressure, to Mr. Goddard, to whose nominee, one Stephens, he had also given £150.

Mr. C. J. Phipps, F.R.I.B.A., recalled, said that since the last meeting of the Commission it had been brought to his knowledge by some memoranda that in 1884 he made Mr. Fowler a present of some money. It was in relation to Hengler's Circus. He made an application to the Board in May, 1884, to rebuild Hengler's Circus, which had been closed in the same way as the Criterion Theatre. In June his client called on him and informed him that the Theatres Committee of the Board of Works objected to the site for rebuilding. It was proposed to make the new buildings fireproof. Witness called on Mr. Fowler and stated the circumstances to him, and asked him the best course to adopt. Mr. Fowler suggested that he should write to the clerk of the Board, asking that the matter should be referred back to the Theatres Committee for reconsideration. Lord Herschell: Of which Mr. Fowler was a member. It would go from the Board to the Building Act Committee, and then to the Theatres Sub-Committee?—Yes. The Theatres Committee report to the Building Act Committee, which reports to the Board. We were anxious to stop this getting into the newspapers. I wrote to the clerk of the Board on June 9, 1884, and on the 11th received a reply stating that the matter had been referred back to the Theatres Sub-Committee in order to afford an opportunity for a conference. A week later I had an interview with the committee, having had a model made in the meantime. The matter was argued out very fully in a full committee, and they arrived at the conclusion that if we blocked up all the windows of adjoining properties looking on the circus there would be no objection to the site as a site. That was the whole of the matter. The plans were passed on the 16th of July, 1884. On the 31st of July I called on Mr. Fowler and said, "You have been very kind to me in this matter, and I am very much obliged to you." I gave him £40. He did not ask for it. There was no condition made, and I gave it to him as a voluntary present.—Lord Herschell: Mr. Fowler was a member of the Theatres Sub-Committee?—Witness: Certainly. Then in reference to lots 2 and 3, Shaftesbury-avenue, it is within your lordship's knowledge that the £200 payment has been returned.—When?—In July of last year Mr. Fowler sent for me and said, "I find that Mr. Hobson's name is mixed up very considerably with Mr. Robertson's in the inquiry made by the Board. You are aware that I have a cheque from him of £200 which ought not to have been paid to me, and I want to hand it back." I said, "I will take it, but it cannot cancel the transaction. Of course, the cheque paid to you appears in Mr. Hobson's books. I will take it back and return it to Mr. Hobson." This I did. The £200 was returned 12 months ago.—You did not state this before?—No.—Lord Her-

schell: It had come to your knowledge that the information had been given to us?—Witness: Certainly. (Laughter.) The £200 was in respect of the Shaftesbury-avenue site, as had been stated before. Witness found that he had given £10 each to two clerks in the employ of the Metropolitan Board.

Mr. Thomas Verity, F.R.I.B.A., said he was employed as architect by the proprietor of the Criterion Theatre. In reply to Lord Herschell, he stated that the Criterion Theatre was pronounced unfit for use by the Board of Works, and Mr. Fowler and Mr. Alderman Saunders were called into council. Mr. Saunders did not really assist in the drawing of the plans, which were witness's entirely, but they were coloured in a certain way which Mr. Saunders thought might make them clearer to the Board.—Is that all that Mr. Saunders did in connection with them?—Yes. In 1883 Messrs. Spiers and Pond bought the site of the Cook Tavern in Fleet-street, and witness was instructed to prepare the plans. Mr. Haines, who was Messrs. Spiers and Pond's agent, suggested that Mr. Saunders should also be employed, because they felt under an obligation to that gentleman. Witness said that if he had a partner he must have 7½ per cent., not 5 per cent., and on April 14, when they settled up, he handed Mr. Saunders a cheque for £450. That, he understood, was for Mr. Saunders's services in connection with the Criterion.—Lord Herschell: Did he take a joint share of the work?—Witness: No, he did no work at all. In reply to Mr. Grenfell, witness said he was architect to the Lord Chamberlain's department. He always considered the Criterion the safest theatre in London.

Mr. John Alexander James Woodward, district surveyor for Central Lambeth and part of Battersea, stated that he was originally an assistant in the office of Mr. Saunders. He had received £200 in connection with the Pavilion business.—Did you meet Mr. Villiers in Robertson's office at the Board of Works?—Yes. A suggestion was made that I should see Mr. Saunders and ask him to give what consideration he could to the claims which Mr. Villiers considered that he had on the Board as an old tenant.—That was before he had got the site?—Yes. I saw Mr. Saunders. The question as to who was acting professionally for Mr. Villiers was raised.—By Mr. Saunders?—Yes.—What did you say?—I told him that Mr. Villiers had no architect. I had previously spoken to Mr. Villiers on that subject, seeing a little difficulty ahead.—What was the little difficulty?—I thought Mr. Saunders might expect to act.—And you could not be certain of securing his interest for Mr. Villiers unless he was going to be architect?—No, I would not say that.—What was the little difficulty?—I thought Mr. Saunders might have to act for Mr. Villiers, and I wanted to be in a position to say whether Mr. Villiers was committed to any professional man or not.—You found he was not?—Mr. Villiers assured me he was not. I asked Mr. Saunders whether it was a matter in which he could act, and he said "Yes."—Was this before Mr. Villiers had got the site?—Yes.—Did you say to Mr. Villiers in Mr. Robertson's office, "About this affair, Isaacs and Florence are posing themselves over London as your architects"?—I told Mr. Villiers that Mr. Saunders had stated that Messrs. Isaacs and Florence were declaring themselves to be the architects.—Did not Mr. Villiers say, "How can that be, as nothing is finally settled"?—I do not remember; but, as a matter of fact, he did not want an architect at all.—Did you go afterwards with Mr. Villiers to Mr. Saunders?—Not with Mr. Villiers. There was an appointment made. When I arrived Mr. Villiers was with Mr. Saunders.—You did not hear all that passed between them?—No.—Did you say, "They are not friends, and I do not think you will get any support from Mr. Saunders if Messrs. Isaacs and Florence are architects"?—No; I swear I did not.—You intimated to him, I suppose, that he had better have Mr. Saunders?—I do not think he required any intimation.—What do you think you got your £200 for?—Well, I think I got that for the introduction and persuading Mr. Saunders afterwards to adopt the elevation of Mr. Worley.—Did you give any portion of the £200 to anyone?—No. Witness further stated that he had acted for Mr. Saunders in compensation cases against the Board which he could not take himself



12 or 14 years ago.—What did you give Mr. Saunders—half, or what?—I think that was the arrangement—half.—Think, now?—It is some 14 years ago, and to the best of my recollection it was half.—With the exception of the £200, have you had any pecuniary transactions with Mr. Saunders since?—No other.—By Mr. Winch: I was quite competent to take the Pavilion work myself, but there was no likelihood that Mr. Villiers would give it to me.—Why not you instead of Mr. Saunders?—Lord Herschell: I think the reason is perfectly plain, Mr. Winch.—Have you paid anything to any other official of the Board?—Yes; £25 to Mr. Robertson. That was because a client had taken some ground at Peckham, and 18 months afterwards Mr. Robertson said I had made some money out of it, and had not given him a friendly consideration.—Had your client tendered for it?—Yes, direct to the Board.—Had Robertson given any advice as to what he could buy it for?—Lord Herschell: We know perfectly well now what Mr. Robertson's position was and what he did.

Mr. Statham Hobson, auctioneer, recalled, stated that in the summer of 1887 Mr. Phipps called on him with a message from Mr. Fowler and a cheque for £200. He said that Mr. Fowler wished to return the £200, as in the inquiry held by the Metropolitan Board of Works the witness's name was mixed up with Mr. Robertson's, and he did not wish it to be said he had received any money from him, and that he would rather lose the money than have the cheque. Witness knew perfectly well that Mr. Phipps and Mr. Fowler were working together because Mr. Fowler was a member of the Board. The last money he gave Mr. Robertson was on February 29, when he gave him £500 to close transactions between them.

Mr. Francis E. H. Fowler, F.R.I.B.A., till recently a member of the Board, was recalled and cautioned by Lord Herschell. Lord Herschell: When you were examined before you were asked particularly whether you had received any money in connection with advice as to theatres. Your attention was called specially to the question of exits, and you said that as far as you knew you had not given any such advice or received any fee?—Yes.—We are informed that you received £100 in connection with the proposed alterations of the Criterion Theatre?—That is not so. What I was concerned in was the ventilation at the rear of Messrs. Spiers and Pond's premises. At the time the theatre was closed I was interviewed by Mr. Haines, and also by the late Mr. Webster, the contractor for Messrs. Spiers and Pond, as to the exact reason why the Board had come to their decision. I explained that the theatre was closed because it was ventilated by artificial means. Mr. Webster asked me what could be done to remedy the defect, and I told him nothing less than reconstruction, unless Messrs. Spiers and Pond would consent to give up a large portion of the rear of their premises at the restaurant for the purpose of forming an area so that they could get direct ventilation down to the theatre. Upon that he asked me to go and see the premises with him. Nothing was said about payment. In answer to further questions, witness said he inspected the premises, made calculations, and suggested a scheme whereby they could get an external area right down to the theatre. The Board had nothing to do with the ventilation of theatres, and he would not have gone into the question of entrance and egress.—You did not receive the payment from Mr. Webster?—From Mr. Haines.—Did you know that Mr. Saunders was receiving payment?—I knew he was employed.—Did you know that Mr. Goddard was receiving payment?—I did not.—You were asked about receiving money in connection with advice given to persons applying to have plans passed. Did it never occur to you that the Criterion would come within the scope of that question?—No. I thought it clearly without the scope.—At the very time when the matter was before the sub-committee you received this £100?—Not at all; afterwards. At that time the reference was discharged and the whole thing was at an end.—Immediately after that Mr. Verity sent in new plans?—Two months afterwards, but as to the old ones on which we had legislated the reference was discharged.—We know now that it was paid to you as a bribe—it never occurred to you that it was equivocal?—I should think not.—It did not seem strange

that they should come to you as a member of this sub-committee to consult you about the closing of the theatre and how it should be reopened? Your position did not seem an equivocal one?—It did not.—Was there no other instance in which you received money?—Not to the best of my knowledge and belief. It is difficult to remember every action of mine for the last twenty years.—Will you swear there was no other instance?—I think I can swear that most conscientiously.—We have heard that there was a case in which you received £40?—Yes. Mr. Phipps gave me that as a voluntary gift.—How many more voluntary gifts have you had?—I do not remember Mr. Phipps giving it to me. He said so, and I believe he said what is true, but I do not recollect it.—There may have been a good many voluntary gifts you have forgotten, perhaps.—I do not think I should forget anything of that kind.—I hardly remember that I got that £40, although I believe Mr. Phipps is right.—Your memory is imperfect, perhaps. Did you give any advice in connection with the plans of the Camberwell estate?—It belonged to a client of mine, and I laid out the estate for him. I was only paid what I regarded as my professional fee—50 guineas.—Was Mr. Saunders called in in relation to the same estate?—I do not know.—You told us last time about the payment of £200 by Mr. Statham Hobson to you, but you did not tell us that you returned the money.—I did not.—What did you return it for if it was perfectly honestly obtained?—There was an inquiry at the Board and I found that it was stated that Mr. Robertson and Mr. Hobson were connected. It came through the hands of Mr. Hobson, and I said I would not have it, but would rather lose the money.—Where was there anything to be afraid of?—I was not afraid, but I did not like to have the money through Mr. Hobson's hands.—You sacrificed £200 and still thought it was a perfectly honest transaction?—So I do now.—It never even occurred to you that there was anything wrong in the transaction?—It did not.—Why did you not communicate it to the Board?—I had no ground for doing so. I had no evidence.—Why did you not seek to get evidence?—I did not suppose there was anything wrong.—By Mr. Bosanquet: The £100 was sent to witness. It was a professional fee. He gave no receipt for it, nor did he for the other payments of £200 and £40. No account was entered in his books; they were put down as fees.—In answer to Lord Herschell, the witness said he voted for the closing of the Criterion in the committee on the ground of want of ventilation.—Lord Herschell: Then the point on which you were consulted was one of the very points on which you had to determine?—Witness: The question of ventilation is excluded from the Act.—Yet you voted on that ground?—And other things.—Lord Herschell: I must warn you that in my opinion you have not been candid with the Commission.—Witness said he considered that the Board had nothing to do with the ventilation. He did not advise with respect to the theatre, but with respect to the area, so that when reconstructed there would be proper ventilation.—That is, advising as to reconstruction?—Partly.—Whether that would be sufficient would be a matter on which you would have voted as a member of the Theatres Sub-Committee?—Yes.

Mr. Robert Evans, surveyor and architect, said he prepared the plans for the Albany-road estate in Camberwell. The proprietor, Mr. E. Bird, consulted Mr. Fowler and Mr. Saunders, witness having been unable to get the plans passed by the Board. A line of frontage was added by Mr. Fowler and Mr. Saunders—a work of about ten minutes; and after Mr. Fowler and Mr. Saunders had been consulted the plans passed through. Witness had another estate at Brixton. He had complied with the provisions of the Building Act in every way, but the plans had not been passed, nor had he received any reason from the Board why they were not.

Mr. James Snelling, a member of the Brixton Vestry, said he formed one of a syndicate who were making a new road crossing Rush-common in Brixton. On one occasion he met Mr. Fowler, who asked witness to introduce him to the syndicate. Witness replied that an architect was already employed, Mr. Evans. Mr. Fowler remarked, "It would be advisable, because I could make things go so easy for you,

I could make a nice promenade in the front of you." The matter was discussed at the syndicate, and Mr. Fowler's services were declined, as the syndicate considered they had complied with all the rules and regulations, and could see no reason why the Metropolitan Board of Works should not pass their plans. Subsequently he met Mr. Fowler, and told him they could not entertain his wish, and that gentleman said, "I think you are foolish; I could have done you a lot of good." Subsequently, at a meeting of the Vestry presided over by Mr. Fowler, that gentleman was pressed as to the reason why the Metropolitan Board of Works had refused their plans. The excuse he made was that Rush-common had been cut through. This common had, however, been cut through by other people and building was going on. The explanation being considered unsatisfactory, witness informed the Vestry of Mr. Fowler's offer, and told them of the conversation already referred to.

At the fifteenth session of the Royal Commissioners, held on Tuesday, Mr. Charles Dunch, architect, recalled, said he had no monetary transactions with either Goddard, Robertson, or Villiers; he had many transactions with the Board for many years, and was astounded at the evidence given; he had paid no part of his fees away, had nothing to do with the demolition or rebuilding of the London Pavilion, either directly or indirectly.—Mr. Felix W. Spiers (Spiers and Pond) said he was chairman of the Criterion Theatre, which was opened in 1873. In May, 1877, notices were served upon witness by the Metropolitan Board of Works that the place was unfit for a theatre. Mr. Haines, witness's agent, had a free hand entirely in the matter, and had the power to spend what he liked. He paid, in 1883, 250 guineas, which probably went to Mr. Saunders and Mr. Fowler. Witness first had transactions in purchasing goods with members of the Board in 1883, when the theatre was in progress; but the amounts were unimportant. Mr. Saunders acted as joint architect in respect of the Cock Tavern, but he did nothing.—Mr. Winch, Q.C.: But he had the £450.—Witness: That was between him and Mr. Verity. We gave £1,300 to the three architects.—That was very "substantial gratitude," was it not, for what he had done?—I don't know that; it was a matter between him and Mr. Verity.—You thought that for the services Mr. Saunders had given you at the Board he ought to be joint architect of the building?—I do not know that. By Mr. Winch: A cheque was paid to Mr. Verity for £1,300 in connection with that matter, and Mr. Verity handed Mr. Saunders a cheque for £450. Lord Herschell: But you paid  $\frac{7}{8}$  per cent. instead of the ordinary 5 per cent.?—That is correct. Mr. Winch: May I put it that that was rewarding Mr. Saunders?—I do not know. You can put it that way if you like. Witness added that the original Cock Tavern, which was resold to the Bank of England, and the new site, were both purchases from the City Commissioners of Sewers, and Mr. Saunders was then a member of the City Corporation.

Mr. Joshua Ellis, manager to Messrs. Spiers and Pond, said after the Criterion plans were passed, £10 was paid in recognition of his politeness to Mr. Lancaster, a clerk in the employ of the Board of Works.

Mr. Charles Bowyer, proprietor of houses in Goldhawk-road, Hammersmith, deposed that he could not obtain permission from the Board of Works to bring out certain shops in that thoroughfare, whereas another landowner in the same district was granted permission similarly to extend his line of frontage. In the latter case Mr. Millwood, an officer of the Board, was employed to draw the plans. In reply to the president, witness said that his architect had called at the Board offices to inquire the reason, and they refused to answer any questions. Witness then called and saw Mr. Vulliamy, the superintending architect, and endeavoured to find out what the objections were, and what would be allowed. He was ultimately informed that the Board were not in the position to give the information asked for by him; but that Mr. Vulliamy was ready to receive any amended plans which might be submitted. Witness attended at the Board of Works, and was told that if he asked to see Mr. Blashill, he might, as a favour, assist him; that he could make no promise, but that if



asked as a favour, he might perhaps give witness a hint which would help him.

Mr. Meadows White, Q.C. (to witness): Did not Mr. Blashill give a long interview in reference to the plans, and hear both you and the district surveyor?—Yes.—The President: But that was entirely as to the line of the building.—Mr. Meadows White: But the Board have no jurisdiction; it lies with the superintending architect, and the Board can only give its consent to the bringing out of the building line.—The President: Yes, they alone can do that. In the first instance in this case no building line was fixed, and witness asked to be allowed to have other plans prepared, showing the building coming over the forecourt, and that was refused, and then witness asked why, and was told he could put in amended plans throwing some of the ground into the front, but could not hear any more about it. After the general line was fixed he was then told that his plans were rejected.—Lord Herschell: I think that is the general case.

Mr. Ernest Schneider, architect, said that Mr. Barclay, Hammersmith, employed Mr. Millwood to make plans of a contemplated projection, and was allowed to build forward in an advanced line of frontage. Witness applied on behalf of a client for similar permission and was refused.

Mr. Alfred Millwood, now employed in the Architect's department as assistant valuer, being recalled, said that on only two occasions had he made plans for persons who wished to bring forward the frontage of buildings, and these were one-story shops only. One of these occasions was eight or nine years ago, and the second was the case of Mr. Barclay's property in 1883. Mr. Barclay was a very old friend, and witness drew the plan out of office hours at that gentleman's request. He had not the slightest influence in obtaining approval of the plans, and had practically kept clear of these transactions since he had been transferred from the Estates to the Building Acts office. Witness never said a word in the office about doing these plans.—Was it understood that clerks in the office were at liberty to do work for people outside with reference to plans coming before the Board?—I think it was known. It was not an understood thing. Witness did not put his name to the plan for Mr. Barclay, as it was merely a small tracing.

Mr. William Bradley said he was employed in the Improvement and Compensation of Estates Department of the Board, having been appointed in April, 1878. He was entirely under Mr. Goddard. He prepared details for valuations, which were submitted to Mr. Goddard, and he would settle the amounts which the Board was to give for any property. He never had any transactions for anyone outside the Board. In two instances he received money from people connected with properties which had been purchased by the Board. In August, 1885, he bought with a Mr. Hards property in Europa-place, at Battersea, which was scheduled by the Board. They bought it under another name for between £400 and £500, and resold it to the Board for £700. Witness valued the property for the Board at £660. Witness received £124 as his share of profits from the transaction. In April, 1886, witness bought also with Mr. Hards, but in a different name, property in the Hughes Fields Scheme, Deptford, for between £1,400 and £1,500, and he re-valued it for the Board, two and a half years later, at £2,800. Mr. Goddard valued it at £3,000, and that sum was paid by the Board. Witness had £500 out of that transaction, and Mr. Hards took the rest, having financed it all. Witness was still assistant valuer to the Board, and had a salary of £350 a year. Witness had purchased ground rents at Greenwich, on land scheduled for the tunnel scheme, but had now no interest in the property, which he afterwards surveyed for the Board with Mr. Goddard.

Mr. Thomas Blashill, F.R.I.B.A., superintending architect to the Board, recalled, was examined by Lord Herschell as to the method of settling building lines adopted by the Board, with especial reference to the witness Bowyer's case. At its close, Lord Herschell remarked that, so far as he could discover, there was an enormous amount of trouble given to applicants, who appeared to be entirely at sea with regard to this matter. Plans were sent in and were rejected, and while people might have been told from the beginning that it was no good

sending in their plans, no information was given them.

Mr. Edgar Harper, assistant to Mr. Robertson in the Estates branch of the Board, said his duty was to register particulars of all property purchased by the Board. He never did any work for anyone outside the office, and on no occasion was he interested in any transactions affecting the Board's property.

Mr. Frederick John Lankester, one of the clerks of the Metropolitan Board, said he had received a £10 note from Mr. Haines, agent for the Criterion, months after the passing of the plans. He did not know what the payment was for, but accepted it.

Mr. Haines, recalled, said he had no recollection of the transaction referred to by the last witness. If he did make the payment, it must have been in connection with the Criterion.

Mr. Matthew Goddard was recalled, and handed in a long list of payments which had been made to him in addition to those of which he had already given evidence. Witness denied the statement of Mr. Garraway that the payments paid by that gentleman to himself had been extracted or extorted from him.

Mr. John Hebb, F.R.I.B.A., assistant architect, and chief of the Building Act branch of the Board, was recalled. In reply to the President, witness said he had frequently, between 1880 and 1885, made applications to theatres for boxes or stalls. He might have done this, perhaps, once a month. The applications were addressed on the Board's notepaper, and the persons by whom they were received would know that the department had the supervision of theatres. He recollected obtaining seats for two members of the Board, Mr. Fell and Mr. Furniss. He had never received any commission, fee, or other consideration, nor had he made any transactions with the Board's property.

The Commissioners again adjourned.

#### INSPECTION OF BRIDGES.

SOME time ago we alluded to the necessity there exists for an official inspection of railway bridges. Not a few of these structures were built sixty or seventy years ago, when iron construction was young and in its experimental stage, and when locomotives were considerably less in weight than they are now. Many collapses and falls of bridges have taken place during the last few years, but the same want of information and attention prevails respecting them. In America the question has been even more keenly discussed. Many sad records of railway-bridge catastrophes have been published—some of them heartrending and thrilling—in which fire has added to the horrors of a sudden precipitation of heavily freighted trains. Some time ago a circular was issued by the American Society of Civil Engineers, embodying suggestions about measures to insure an inspection of railway bridges. These suggestions were discussed at the annual convention in July last, and the remarks made by several engineers are of interest. In America the art of bridge construction is carried on by a number of contractors who know very little of the subject, but who undertake the business; many of the structures are put to uses for which they were never intended. Some useful suggestions are made by Mr. John A. Wilson, C.E. In reply to the question, What is proper bridge inspection? Mr. Wilson points out that a railway structure may be under constant surveillance. The engineer in charge could make an inspection once a year or oftener; he should keep a record of his observations and of the reports made to him by the foreman; the latter should make an inspection once a month or oftener, and report to the engineer; the road foreman should make a daily inspection and report any defects to the chief foreman, so each in turn would do his best to keep the structure in a safe condition. Plans of the structure with strain sheets and calculations of its safe load would be in the hands of the engineer. When the bridge is an old one it should be measured and calculated, and plans prepared to discover its capabilities, and to base operations. Now, the majority of the bridges that do duty come under the second class: they have original defects of design, material, and workmanship, and it is impossible to put them into a safe condition without a reconstruction or costly alterations. A perfect record of every

weakness in plates, riveting, flanges, proportion of latter to web, piers, and foundations is of the first importance; having this record the engineer or his assistants can periodically test any point to see if the weakness grows or not, and to enable the quickest remedy to be applied in case of need. We can imagine an official inspector inspecting a bridge yearly or monthly without perceiving the weak point; we can imagine him expending labour and money on the structure without really touching the real mischief, which may be hidden from view or not readily perceived by examination of the drawings. It should be observed whether each part of the structure is really doing its proper duty. Mr. Waddell suggests that every company in the States should have prepared and filed a report by a qualified expert upon the capacity of every bridge. The report should consist of a diagram, showing sections of all main members and stresses to which they are subjected by the standard maximum load; also sketches of all details, chord packing, riveting. He also proposes that the main dimensions of the structure and sections of all members should be recorded in a certain manner, so that any particular data may be found immediately by inspecting the notes; that the sizes of all parts in the neighbourhood of each panel point, and each connection of main members, the spacing and diameter of rivets, the packing, dimensions of eye bar heads, thickness of bearings, and other details be recorded systematically; also the details of main members; that all faults in manufacture or design, the effect of wear, such as loose rivets, bent pins, rust, cracked castings, and defective masonry should be examined. The floor system, ties, rails and guards are also to be examined, the effect upon the bridge of rapidly-passing trains, the deflections caused thereby. Most of the answers received also agree that a standard specified rolling load should be adopted, and a specified engine wheel base for rolling loads. There is little doubt that many of the failures of these structures have arisen from the actual loads exceeding the specified loads. The old bridges were designed for much less heavy engines than are now in use. Their margin of strength has been reduced also, by wear, oxidation, settlements of piers, and other causes. One of the replies proposes a number of standards for rolling loads, graded according to the train weight, and the present and probable future traffic. He observes that it would be waste of money to require every bridge to carry the heaviest traffic. Another suggestion is that a standard bridge floor be adopted, so constructed as to carry safely a derailed engine or train over it. Other suggestions of a detailed character are thrown out. The proper instruction and examination of bridges will necessitate a division of the labour. First we have old structures, whose dimensions are not on record, and for which drawings and details of minute character would have to be prepared, together with a careful record of defects; second, we have structures of recent construction whose dimensions are known, and the plans of which remain. There would be little difficulty with regard to the second class of structures, as the engineers who have designed them are probably still living, or the details are in existence; but with the old bridges a very minute examination would have to be made, especially the amount of wear, and rust, and other defects due to vibration or settlement.

#### LIGHTNING RODS.

SOME useful particulars are given in Professor Oliver J. Lodge's lectures on the "Protection of Buildings from Lightning," delivered at the Society of Arts. Referring to the tape and rod forms of conductors, it is pointed out that Faraday maintained that sectional area was the one thing necessary, and that shape was wholly indifferent; on the other hand, Sir W. Snow Harris considered that tube conductors were just as good as solid rods, and that flattened ribbon was better still. Faraday was thinking of nothing but conduction for steady currents, Harris was guided by experience. The lecturer thinks that Harris was right, and to prove this point he gives the results of experiments made upon two conductors of copper of the same weight, but one in the form of wire, the other in the form of a



ribbon, by which it is shown that the flattened form of conductor has the advantage over a mere round section for carrying off a charge, and with least liability to side flash. As to the deflagration of the conductor, Mr. Preece has found that ribbon and wire are equally easy to be destroyed by a flash. Experiments have also shown that straight conductors have a tendency to side flash, however thick they may be. No conductor, Prof. Lodge says, is able to prevent it altogether, unless it is zigzagged to and fro, in which case it is found to have practically no self-induction, and side spark is nearly stopped. It must also be remembered that a rod of iron carries off a discharge better than a rod of copper; the discharge probably penetrates iron deeper than it does copper; its inferior conductivity is considered even an advantage in rendering the flash slower and less dangerous. When galvanised, it can be made almost as durable as copper, and its liability to get magnetised is no objection. Prof. Lodge thinks the use of copper for lightning conductors is doomed. The lectures are full of interest for the architect. The liability of objects to be struck is shown to depend upon certain conditions—for example, whether the flash occurs from an already charged surface which has strained the air close to bursting point, or whether the flash is produced by a rush of electricity into a previously uncharged conductor too hastily for it to prepare any chosen path. These are considered, and the results of experiments given.

#### STRAINS.\*

By G. A. T. MIDDLETON.

#### LOADS ON SUPPORTS.

THE primary object of cantilevers, girders, bridges, and roofs is to convey loads from their point or points of application to the points of support. In doing this various stresses are set up in the different members of these structures; but before the amount of these can be ascertained with any degree of accuracy, it is necessary, as will soon become apparent, to determine the proportion of the loads borne by each support.

In the case of cantilevers, it is evident that, there being but one support, the whole weight must be borne by that support, whether the weight be fixed in one spot or divided into many smaller weights, or evenly distributed along the length of the cantilever.

The load itself, however, is, in the case of a cantilever, but a small proportion of what has to be borne by the support. Were not the weight  $W$  (see Fig. 1) counterbalanced by

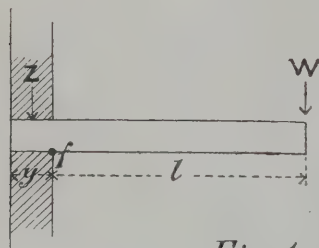


Fig. 1.

another weight,  $Z$ , the cantilever would overturn about the fulcrum  $f$ . The weight  $Z$  necessary to prevent this can be readily ascertained, the cantilever now forming a lever of the first order by taking movements about  $f$ , remembering that  $Z$  may be considered to be applied at the centre of gravity of the surface pressed, or, in the example before us, at the centre of the wall. Thus, to produce equilibrium—

$$Z \times \frac{y}{2} = W \times l$$

$$\text{or—} \quad Z = \frac{2Wl}{y}$$

A rather greater counterbalancing weight than  $Z$ , as ascertained above, should in all cases be provided for the sake of stability; but where a cantilever is built into a wall, this need not all lie directly over the cantilever, as

all the bricks or stones which would be lifted in case of its overturning may be included in the load (see Fig. 2). This allowance varies

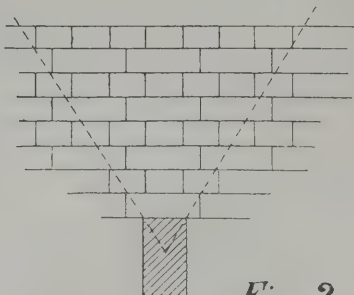


Fig. 2.

with the bond employed; but as a general rule all material which would be inclosed by an equilateral triangle having the centre of the cantilever for its apex (Fig. 2) may be safely considered as forming part of  $W$ , no additional allowance being made for the adhesion of the mortar.

When the load on the cantilever is distributed (Fig. 3), it may be considered to act at

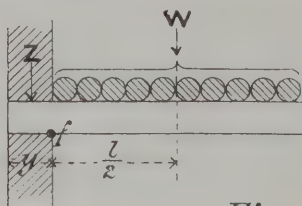


Fig. 3.

its centre of gravity, and the distance of its application from  $f$  becomes  $\frac{l}{2}$ . Then—

$$Z \times \frac{y}{2} = W \times \frac{l}{2}$$

Or—

$$Z = \frac{4Wl}{y}$$

In either case, the weight  $Z$  can be made up in many ways, as the exigencies of each case demand, and the total weight borne by the support becomes  $W + Z$ .

When a fixed load is borne by a girder at the centre of its span, common-sense tells us that half is carried by each support; but the proof of this depends again upon the theory of the lever, and as the proof is the same when  $W$  rests at any other spot than the centre, such a case is shown in Fig. 4. The girder may be con-

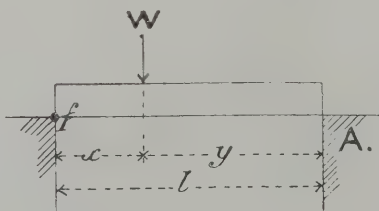


Fig. 4.

sidered as a lever, working round the fulcrum  $f$  to produce the load  $A$  on the right abutment. By taking moments round  $f$  to produce equilibrium, we must have—

$$A \times l = W \times x$$

Or—

$$A = \frac{Wx}{l}$$

This can be shown to scale graphically, as in Fig. 5. Set up  $W$  to a scale of so many tons or pounds to the inch over the abutment  $A$ . Join the extremity  $b$  of this line to  $f$ . From  $e$  (a point vertically under the point of applica-

\* In this, as in most works on this subject,  $W$  is taken to represent a fixed load, or the total of a distributed load,  $w$  the load per unit of length (generally per foot), and  $l$  the length.

tion of  $W$ ) draw  $ec$  parallel to  $fb$ ;  $cb$  will then represent  $A$  to the same scale as that in which  $db$  represents  $W$ . The reason for this is that  $bdf$  and  $cde$  are similar triangles, and so the

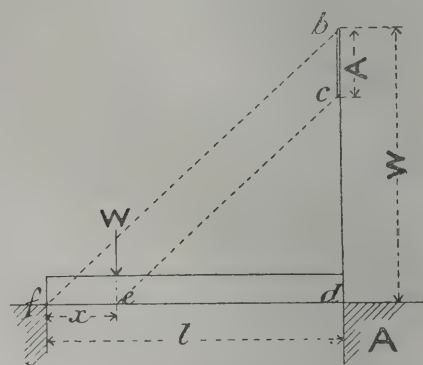


Fig. 5.

sides  $bd$  and  $fd$  are cut proportionally by the parallels  $fb$  and  $ec$ . That is—

$$bc : fe :: bd : fd$$

Or, in other words—

$$bc : x :: W : l$$

Which is the same as saying—

$$bc \times l = W \times x$$

Or—

$$bc = \frac{Wx}{l}$$

Proving  $bc$  to be equal to  $A$ , as obtained by the previous reasoning.

Where there are several loads on a girder, each can be considered separately as above, and the totals on each abutment added together; or else all can be treated in one single diagram by a somewhat curious application of the polygon of forces.

Suppose a beam or girder resting on the supports  $A$  and  $B$  (Fig. 6) to carry loads of

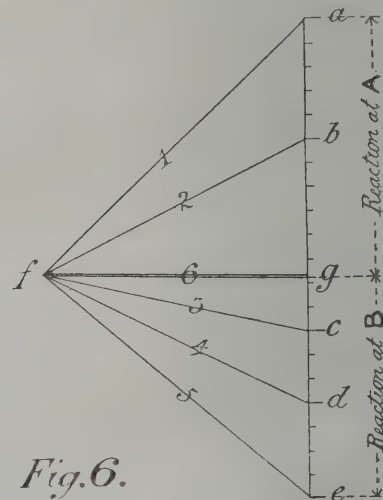


Fig. 6.

5, 8, 3, and 4 tons respectively where shown, the beam in this case being delineated by a single line. Place arrows pointing downwards over each load, to denote the direction in which it acts, and arrows pointing upwards under the point at which the effect of the loads is transmitted to each abutment. Letter the spaces between these arrows in alphabetical order, commencing at the left-hand side, the space between the upward arrow under  $A$ , and the downward arrow over the load of 5 tons being lettered  $a$ ; that between the loads of 5 and 8 tons being lettered  $b$ , and so on.

As the load of 5 tons lying between the spaces  $a$  and  $b$  acts vertically downwards, set off at the side, to a scale of weights, as before described, a distance representing 5 tons on a line drawn vertically downwards from  $a$  to  $b$ . Proceed in the same manner, setting off a distance representing 8 tons vertically downwards from  $b$  to  $c$ , to signify the load of 8 tons acting vertically downwards between the spaces  $b$  and  $c$ , and so on, taking care to make the letters on sketch and diagram tally for ease of reference. By



this means all the loads on the girder can be set down to scale, and it is only then required to divide the whole vertical line *ae* into two parts, to denote the proportions carried by the two abutments.

Assume any point *f* outside the line *ae*, and join *af*, *bf*, *cf*, *df*, and *ef*. Drop vertical lines through the centres of each load (on the sketch), and also through the points A and B, where the loads are transmitted to the abutments. Assume any point in the line drawn thus through A, and from this point draw a line parallel to the line *fa* (on diagram) until it meets the vertical line through the load of 5 tons. Place another letter *f* on the opposite side of this new line from *a* to represent the space in the centre of a polygon, of which this line is one side, and it will be seen that there is a line between the spaces *f* and *a* upon the sketch parallel to the line *fa* on the diagram. From the termination of the line between the spaces *f* and *a* draw another between the spaces *f* and *b*, parallel to the line *fb* on the diagram, and terminating under the load of 8 tons, and proceed in this manner until the abutment B is reached. Join the extremities of these lines under the abutments A and B, inclosing *f* (by the line which is drawn double on sketch), and letter the space outside this and between the two upward arrows *g*. The polygon now formed could be taken to represent in outline a truss such as would be in equilibrium under the assumed loads; and, by drawing through the point *f* on diagram a line *fg* parallel to the double line between the spaces *f* and *a* until it cuts the vertical line *ae*, the proportion of the total load borne by each abutment can be measured off, that carried by A being equal to the weight as measured by the original scale of weights, represented by *ag*, and that carried by B being equal to the weight represented by *ge*.

The loads and the proportions borne by the abutments are now represented by the closed polygon *abcdega* on the diagram, the loads *eg* and *ga* on the abutments being supposed to act upwards, as indicated by the arrows on the sketch in the first instance. This upward action, or, more correctly speaking, passive resistance, of the supports is an important factor in many calculations, and is generally known as the *reaction of the supports*. It is exactly equal at each support to the proportion of the load borne by that support, but necessarily opposite to it in direction in order to cause equilibrium.

In Fig. 6, and in all other drawings throughout this work in which reciprocal diagrams are used, lines which have to be drawn parallel to one another upon sketch and diagram are similarly numbered.

This reaction of the supports is supposed to occur at the centre of that portion of the girder which rests on the support, and in all cases of calculation affecting beams or girders it is usual to consider the span as from centre to centre of bearings, this being the "effective span." In diagrams this is usually shown as in

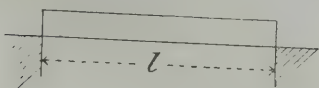


Fig. 7.

Fig. 7, *l* being the "effective" span from centre to centre of bearings, and not the clear span, as would appear at first sight.

Half of a distributed load on a beam is evidently carried by each support, and when part of a beam bears a distributed load, while the remainder is unloaded, such distributed load must be treated as a fixed load having its points of action at its centre of gravity.

While upon this subject it may be well to note that the centre of gravity of a number of loads resting on a girder can be ascertained as shown by dotted lines in Fig. 6, by continuing the line between the spaces *f* and *a*, and that between the spaces *f* and *e*, until they meet, which they will do vertically over or under the centre of gravity of the loads.

(To be continued.)

#### STRATA FLORIDA ABBEY.

LAST year Mr. Stephen W. Williams, F.R.I.B.A., of Rhayader, commenced to excavate the site of the Cistercian Abbey of Strata Florida, in Cardiganshire, and he read a paper thereon at the Denbigh meeting of the Cambrian Archaeological Association. It was then determined to continue the excavations and store on the spot the mouldings and other details of the church now hidden, with a view to elucidate the style and period of the building, and preserve its remains, under the care of a local committee. A fund of upwards of £90 has been collected, and, though not sufficient to complete the work, the estimated cost of which is £150, the committee determined to begin the excavation, under the superintendence of Mr. Williams, who has undertaken to direct and superintend the work gratuitously. The works are now in progress, having been commenced on the 24th May last, and a staff of twenty-two men, under Mr. Telfer Smith, as clerk of works, is employed in clearing away the rubbish of three centuries of neglect. About half of the nave, and the north and south aisles have been cleared, together with the whole of the north transept and its three eastern chapels, about half of the presbytery, and the exterior of the north transept, the east end of the presbytery, and the east side of the south transept and chapter house, disclosing the freestone plinths and buttresses, showing that the entire building had fine-dressed freestone quoins throughout. The excavations have already brought to light a most valuable series of architectural details, much of the carved work resembling in its character that at Lincoln and St. David's Cathedrals. The nave arcades were of richly moulded pointed arches of Early Transitional work, alternately of different sections. Already three distinct sets of mouldings have been discovered. Fragments of carved capitals have been found, and portions of the moulded bases and shafts of the piers. In the north transept was found the great north door, with carved mouldings of lily pattern, the same as in the north doorway of St. David's Cathedral. The three eastern chapels of the north transept had clustered piers, with pointed arches of Early Transitional type, and were groined. The carved central boss has been found in each chapel, together with the bases of the altars, and pavements of incised and encaustic tiles in patterns. Some of the tiles have armorial bearings and designs. The tile pavements are of rich glazing and colouring. Fragments of plaster painted in fresco have been found, with fragments of stained-glass windows, and much of the stonework has been painted. Externally, on the eastern side of the south transept, have been found a series of monks' graves, some of which have their headstones *in situ*. They are of early date, with very curious interlaced rope-work patterns, of Celtic type, carved thereon. The graves are covered with rough local stone slabs. The presbytery was also groined like the chapels. The ruins of the great central tower still remain to be opened. All the moulded stonework and carvings are carefully removed as the work proceeds and stacked on the spot where found, and an immense mass of architectural details is being accumulated. It is hoped that further subscriptions may be obtained, so that the work may be completed. It is proposed, if sufficient funds are obtained, to cover in one of the chapels, so that some of the more delicate carved work and other objects of interest discovered may be secured from damage or loss. Eventually it is intended to hand over the ruins to a local committee, who will take charge of them. Subscriptions in aid of the excavation fund will be received by Mr. R. W. Banks, Ridgebourne, Kington, Herefordshire, the treasurer of the Cambrian Archaeological Association.

#### DECORATIVE MATERIALS FOR INTERIORS.

THE use of cheap decorative materials for the embellishment of restaurants, buffets, and even theatres has increased. If we enter any of these places we shall find the older materials have been in the main superseded. The floors are no longer of ordinary deal or oak, but of parquetry or ornamental wood blocks; the counters and fittings are of mahogany or

walnut, decorated in a very profuse manner; the walls are no longer of mere plaster or paper, but lined with fine parquet, or painted tiles, or faience, sometimes with Lincrusta Walton; and the ceiling, following suit, is enriched with panels of the latter material or with fibrous plaster, divided by ribs into various geometrical patterns. The walls and ceilings are especially attractive in their luxurious ornamentation and often splendour, and a good effect, too, is obtained by the use of some of the many recently introduced linings for walls and ceilings. Then as to the theatres. The enrichment of the proscenium, the fronts of dress-circle and galleries, and especially the ceiling of the auditorium, are composed of materials which have been of late years brought to a singular degree of perfection, we mean the *papier mâché* and *carton pierre* decorations, the first made out of brown paper moistened with water and glue, and pressed into metal moulds; the latter from cuttings of cardboard converted into a pulp, and cast in plaster moulds. The plasterer and modeller of the old school have been superseded by these ready-made productions of the decorative manufacturer, and when the designs are in good taste, there is very little difference to be observed between the work of the best modeller and the screwed up slabs of the manufactured decoration. The sharp curves and angles and delicate foliage are produced in *papier mâché* with remarkable precision, and for neatness and cleanness surpass the work of the plasterer. The heavier kinds of decoration for ceilings and walls are generally of *carton pierre*, a stone-like composition well known to our readers. The moulds are prepared in plaster, which can be taken to pieces in the usual way. These moulds are then filled up solid, or more generally only lined with the *carton pierre* in a state of pulp. When tolerably dry, the mould is removed, and the material is subjected to heat in a drying room until it is quite hard. Nearly all the ornamental ceilings of our modern buildings and the decorations of private residences of a superior class are of one or the other of these compositions. For ceiling and walls in which the same pattern is repeated, plaster is no doubt the cheapest; but where elaborately ribbed and panelled surfaces and relief ornament is intended, there is no doubt a considerable advantage in using *papier mâché* or fibrous plaster, cast in slabs that can be screwed up to the wood joists or wall battens. All dropping of plaster is avoided, and the work can be put up without injury to the joinery. Some years ago Messrs. Jackson, we believe, constructed a ceiling of this kind for the late Marquis of Westminster at Grosvenor House. It was for a large room, independent of the walls, the whole ceiling being fixed to a wooden core or cradle, which could be raised or lowered some feet by machinery, to suit the condition of the room for sound.

The architectural advantage of this mode of construction is that the ceiling can be made hollow, light, and sonorous; further, that the most intricate design or ribwork can be formed, admitting of a decorative effect by the use of colour. The use of fibrous plaster, or ordinary plaster cast thin, with canvas as a backing, is now very extensively used where lightness and speedy execution are required. We now see the most elaborately designed ceilings reproduced in this manner, which it would have been impossible to execute in the old-fashioned manner, in real plaster or in wooden ribs, at anything like the cost or expedition.

Lady Magheramorne, who was accompanied by Lord Magheramorne and Mr. Stephens, M.P., on Saturday laid the foundation-stone of the new parish church for Hornsey. The site closely adjoins the old fabric, which, though erected in 1830, has been found quite inadequate to the needs of the growing population of the district. The new church, which will have seating room for 1,260 persons, and is to be built from Mr. James Brooks's designs. Towards the cost of erection, estimated at £10,000, nearly £8,000 has been promised.

A fire broke out early on Monday morning at Imperial-road, Fulham, upon the premises of Messrs. Lucas and Aird, contractors. A large one-floored workshop, containing three locomotives and other machinery, became completely involved, and was destroyed, while other damage was caused. The origin of the outbreak has not been ascertained.



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## ILLUSTRATIONS

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DAY OF THE CHOIR OF THE SELECTED DESIGN FOR  
LIVERPOOL CATHEDRAL.—CHURCH OF ST. JOHN THE  
DIVINE, GAINSBOROUGH.—TOWER AND SPIRE, GLAS-  
GOW UNIVERSITY.—OLD OAK CHAIR, WENLOCK.—  
CLUB DESIGN FOR A SCHOOL OF ART.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## CORTILE, PALAZZO VECCHIO, FLORENCE.

LAST week, when illustrating the Colleoni Monument at Venice, we referred to Verrocchio's exquisitely-modelled bronze boy and dolphin surmounting the fountain in the centre of the Cortile of the Palazzo Vecchio at Florence. Though small, the work is one of the most charming productions of Andrea's genius. To-day we give a view of this Florentine Court, including a representation of Verrocchio's figure, and illustrating Michelozzo Michelozzi's magnificent Cortile arcades, which were built from his design in 1454. After the death of Brunellesco, this master of the Italian Renaissance became the great palace builder of the age, and among other world-famed works of the first importance and merit associated with his reputation as an architect is Cosimo de Medici's Palace in Via Larga, now familiar to us as the Riccardi Palace, and which was commenced in 1430. The Cortile there somewhat resembles in general terms the richer example of his skill at the Palazzo Vecchio. After Michelozzi's banishment to Venice in 1433, on his return to Florence he was engaged to repair Arnolfo's buildings at the Palazzo della Signoria, then declared to be unsafe. He made, too, a shrine for the genius of Fra Angelico in the Convent of San Marco, which was begun from his plans in 1437. The magnificent Medici villa at Careggi soon after this was designed and built by Michelozzi, who next erected another Medicean villa at Fiesole for Giovanni, Cosimo's son, and the Tornabuoni Palace was another of his works. The Palazzo Vecchio is too familiar a landmark in Florence to need much description here, while historically it marks the transition from feudal to civic government, and is possessed of many of the peculiarities of the Mediaeval fortress. It stands on the east side of the Piazza del Gran Duca on a cramped site adjoining the "cursed ground," on which once stood the Uberti Palace belonging to the hated and exiled family of that name. Arnolfo di Cambio, its architect, who was a pupil of Niccola, was restricted by the command which forbade his building on that land, and thus the Palazzo Vecchio, in consequence, is irregular on plan. The bell turret, so much admired by the late Wm. Burges, remains one of the marvels of Tuscan tower construction, for it has no solid foundations, but rests its weight for the most part on the machicolations of the façade. The Palazzo thus described was erected in 1298, as the residence of the Gonfaloniere and Priori, or superior magistracy of the Republic. Walter de Brienne occupied it subsequently, and after that, in 1540, the masterpiece of the Piazza del Signori, as it was then called, became the

palace of Cosimo I., who in that year removed from the Riccardi Palace, where the Medici had hitherto lived as private citizens. Here he continued to reside till his removal to the Pitti Palace in 1550. Since then the Palazzo Vecchio has been occupied by government offices. The exquisite detail of Michelozzi's work in this fine cortile is admirably shown by our plate to-day, which is taken from a good photograph by Brogi. Michelozzi was a son of Bartolommeo di Gherardo di Borgognone, and was born in 1396 and died in 1479. He built the Library of the Black Benedictines at Venice, and altered the palace at Milan and the old citadel at Perugia.

## LIVERPOOL CATHEDRAL: DETAIL OF THE CHOIR.

THIS geometrical double-page plate given herewith to-day, from Mr. Emerson's competition drawing, illustrates in detail the refined simplicity and true 13th-century character of the style adopted in this design, which was selected for the first place in the late contest by the referee, Mr. Ewan Christian. In the Royal Academy this year is hung an interior perspective of Mr. Emerson's work, and an illustration of it was printed in the BUILDING NEWS for May 11th last, when we referred to other drawings of the same design published by us on January 15th, 22nd, 29th, Feb. 5th, 26th, and March 26th, 1886. Mr. Christian placed Messrs. Bodley and Garner's design second, and Mr. James Brooks's design third in the competition. Recently, unfortunately for Mr. Emerson, the cathedral scheme has for the present been abandoned. As a model of architectural draughtsmanship this drawing is well worthy of reproduction, to say nothing of the beauty of the design which it represents.

## CHURCH OF ST. JOHN THE DIVINE, GAINSBOROUGH.

ONE of the most notable drawings in this year's Royal Academy (No. 1,852) is that which we reproduce to-day in illustration of the new church and buildings at Gainsborough, from the designs of Messrs. Somers Clarke and J. T. Micklethwaite, the architects. It shows the south elevation with the boys' school and parsonage to the front, and a court-yard between them and the church. The gate-way under the tower leads to this quad, as will be seen by the plan which we published, together with a west elevation of the buildings, in the BUILDING NEWS for May 18th last, when a description of the work was given.

## GLASGOW UNIVERSITY TOWER AND SPIRE.

THE tower of the University buildings at Glasgow was designed and built by Sir G. G. Scott, but the spire was omitted. It was intended by him to be constructed of wood covered with slating and lead. Recently a legacy of £5,000 was left to the University for the completion of the steeple, and as it was feared that a wooden spire might be in danger from lightning, and would require repairs very difficult to execute at such a great height, I was asked to prepare a new design in stone. I took for a model some of the spires of open stone-work to be seen in Germany and elsewhere, adapting the details to suit the building. It has been admirably built by Mr. Thompson, of Peterborough, the contractor for the whole of the University buildings. The effect is certainly satisfactory, and the completion of the lofty tower has had the result of displaying the great merits of Gilbert Scott's fine design in a way which was impossible as long as this important feature was unfinished. A bell weighing 60cwt., with two quarter bells, has lately been placed in the tower. They were cast by Messrs. Taylor, of Loughborough, the clock being by Joyce, of Whitchurch.—J. OLDRID SCOTT.

The worshippers at the Church of St. John the Evangelist, Toft, are now the possessors of a new organ, built at a cost of £230 by Mr. C. Whiteley, of Chester (the builder of the organ in the cathedral of that city).

At Saturday's Horsham Petty Sessions, Mr. G. Mitchell was formally dismissed from his office of surveyor of highways for the Horsham rural district, and Mr. T. Skinner, who is the surveyor of the county, was appointed in his place at a salary of £60.

## ALDWINCKLE TRAVELLING STUDENT-SHIP DRAWINGS.

OLD OAK CHAIR, &C., WENLOCK.

MR. H. V. LANCHESTER has lent us his drawings for which this studentship was recently awarded him at the Architectural Association, and from these studies to-day we have reproduced an interesting example of early 17th century woodwork, sketched in geometric detail at Much Wenlock in Shropshire. The Guildhall there is a quaint timber-built structure, with a piazza. The council-chamber contains some remarkably good fittings carved in oak, and a rich mantelpiece, from which an arabesque panel is here represented. There are some other pieces of furniture of similar character in the room. Wenlock, though a small place, is a corporate borough, the charter dating from Edward the Fourth.

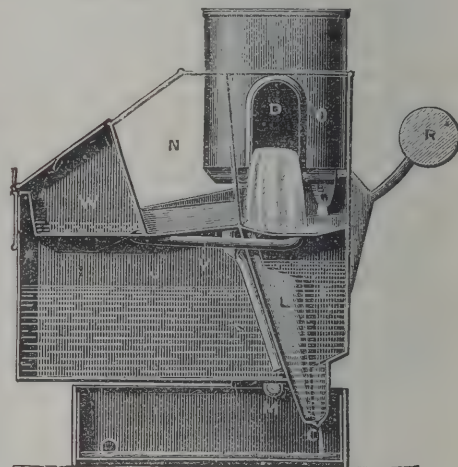
## "BUILDING NEWS" DESIGNING CLUB.

DESIGN FOR A SCHOOL OF ART.

LAST week we were prevented from giving our illustration of the design placed second in the school of art competition, and so to-day we print a reproduction of the drawing. "Boreas" is the motto of the author, and a full description of the design will be found in our review of all the plans submitted, given in the BUILDING NEWS last Friday.

## ROBERTS' IMPROVED RAIN-WATER SEPARATOR.

AN improvement has lately been introduced in Roberts' Rain-Water Separators, which enables them to work in many situations where there was not sufficient vertical space to introduce a horizontal separator of the older pattern. It will be seen by the illustration that the canter is now placed at right angles to the stream of water passing from the head. Instead of the water passing round the side of the canter, and being delivered below, it is now



carried through one of two diverging channels in the upper part of the canter—at first through the one that carries it to the waste pipe, and then through the other directing it to the storage tank. The stream is thus kept in an almost horizontal direction throughout its course. The diminution of the vertical space required will be obvious when we state that the vertical distance between the inlet and outlet pipes for pure water in an old No. 3 Separator was 2ft., while in the new No. 3 it is only 6in.

The negotiations between the Edinburgh and Leith Corporations and the Edinburgh and Leith Gas Company, with reference to the acquisition of the Edinburgh and Leith gas concern, have now been amicably completed. The gas shareholders are to get an annuity of 9½ per cent. and £11,000 in cash—the former being equal to £14,000 a year. The reporters, Messrs. Livesey, C.E., and Laas, C.A., express the opinion that this arrangement is fair and reasonable to both parties.

A carved oak altar table, the work of Mr. J. Forsyth, has recently been placed in St. James's Church, Paddington.



















## WAYSIDE NOTES.

I THINK a few sentences in your leader of June 22nd might possibly be construed into a somewhat unfair attack on Bath stone generally. It is quite true that there is so-called Bath stone which begins to deteriorate as soon as it is in position; but cannot the same be said of any other building material where the architect will not use, and the client will not pay for, the genuine article? You know, I am sure, that the Bath stone supplied by the great Bath stone firms, now amalgamated into one association, is without a rival as a constructional material. Look at Messrs. Wallis and Co.'s premises in Holborn—one unbroken frontage of four hundred feet of solid Bath stone from ground line to roof, built now nearly twenty years, and as perfect as the day the stone left the quarry. Look, again, at the Grosvenor Hotel, Pimlico, built more than thirty years since, and all Bath stone above the ground line except the hard stone landings, with its delicate carving as sharp as the day the chisel was taken from it. The fact is, if Bath stone is properly selected for its work, it is unrivalled as a building material. In the past, when isolated owners of small quarries pushed their single produce unscrupulously, mistakes in selection have doubtless been made; but now architects can be sure of having what they specify, and equally sure that the material will stand the severest test of time and wear.

I am very glad to see that the Royal Gold Medal has been presented to an accomplished designer in the Neo-Grecian style, and I believe that the decision of the Institute Council will meet with the approval of the profession generally, although many would prefer to see the honour conferred on one of our own countrymen. Sending the medal to foreign parts, however, must considerably lighten the task of those who have, in effect, the awarding of it. In this case the honour was most deserved, judging by what one knows and hears of the merits of Baron von Hansen's compositions in a refined style of Modern Greek. It seems to me that the fact that the medal was presented in this quarter points to the conclusion that there is a considerable liking for refined Classic architecture amongst architects. I believe I am correct in saying that when the Gold Medal has been presented to a British or foreign architect, it has usually been to a man whose style is in accord with the fashion of the times. One cannot imagine the token being given, at the present date, to anyone whose peculiar talents are in the direction of producing correct Gothic façades on strict Mediæval lines.

It certainly does not redound to the credit of the recipients of the Institute prizes and medals that only three or four out of the whole number should have been present on the evening when the awards were made. Such conduct savours of ingratitude; and I am quite of the opinion which was then expressed, that with two notifications as to the time when the awards would be made, every prize-winner should have endeavoured to have been present. The Pugin Travelling Studentship and the Tite Prize seem to have been well competed for, if one may judge from the names of those who just missed the prizes. Mr. R. W. Paul will, I am sure, turn his present opportunity to good account, as holder of the Pugin Studentship. One always feels a special interest in this prize, as its object—or its original object, I take it, was to enable the holder to perfect himself in that artistic touch in drawing Mediæval detail which fascinates us all, and which Pugin himself possessed to such an extraordinary degree that he would produce marvels of draughtsmanship with the wretchedest stump of pencil imaginable. I do not see any notice as to the exhibition of the candidates' work, but presume the drawings are on view at Conduit-street.

What a dearth of competitions! The whole-sale-and-for-export competitor must be rather slack of work, as he has doubtless long since polished off any current competitions. No more Imp. Insts. seem to come along, which building, by the bye, seems to be progressing favourably. From a report of a recent meeting of the Organising Committee, held under the presi-

dency of the Prince of Wales, I gather that the foundations of the main buildings have been completed at a cost of £6,000; that a tender from Messrs. Mowlem and Burt, for the making of the new road to be known as the "Imperial Institute-road," has been accepted at the sum of £5,825; and that the same firm's tender of £142,800 has been accepted for the erection of the main building, exclusive of the central, eastern, and western towers. Despite the antagonism that the scheme excited in many quarters, it seems destined to be brought to a successful termination. The competition was certainly a success, except from the defeated competitors' point of view. Let us hope, however, these latter gentlemen gained some consolation from other Jubilee jobs. I have come to the conclusion, by the bye, that the profession could do with a Jubilee every year, though after the fifth twelvemonth or so there would not be much original Mediæval stonework remaining in this country.

The exposures at the Metropolitan Board of Works inquiry continue with unabated vigour. I have been trying to think of some possible extenuating circumstances for the Board, as one grows weary of heaping up condemnations. I do not, however, find it possible to excuse anything in connection with the matter. All one can say is that we can stir up mud in most pools if we agitate the waters. The mud, however, which Lord Herschell has stirred up is of an exceptionally revolting nature. What a nice little family party the M.B.W. officials made, to be sure! The magnitude and frequency of the cheques that changed hands, too, will make the public imagine that any trade or profession connected with buildings, their design, erection, selling, and letting must be the high road to a certain and rapid fortune! When Paterfamilias reads in his morning paper that Mr. — received £450 for acting as joint architect, but doing nothing, in connection with a new building, he will consider that he can safely place at least two of his sons in the noble and exalted profession of architecture. The rush of pupils for the next few months may therefore be expected to be quite abnormal. Premiums will go up 500 per cent. Architects' offices will be crammed; there will be a great demand for rolls of plans wherewith to play "nine-pins" in the drawing-office; assistants will commit suicide by shoals; and the well-premiated architects will go to Henley or Lord's *en masse*. Architecture pure and simple will go to the dogs. Clients and contractors calling at the offices will be told to go to something worse. And all this dreadful state of things will arise from the visions of large commissions and bonuses that will appear before Paterfamilias when he reads the reports of the Metropolitan Board of Works Commission of Inquiry!

Mr. Mark H. Judge writes to the *Standard* of last Wednesday, and asks for contributions towards the expenses of the Metropolitan Board of Works Inquiry Committee, which, since the appointment of the Royal Commission has been incurring expenses—hitherto, for the greater part borne by Mr. H. H. Marks,—by collecting and preparing the evidence laid before the Commission. As Mr. Judge says, the committee is clearly working in the interests of the rate-payers. Those desirous of aiding the work of the committee, may send cheques, crossed "Union Bank of London," to the treasurer, Mr. W. H. Fenton, 11, New Oxford-street, W.C.

I was very glad to see in your recent leader that you advocated the formation of new trade guilds. The first practical step would be to endeavour to elicit the opinions of workmen on the subject. I often wonder that such do not at times comment on questions of the hour in the columns of the "B.N." That they have many ideas we know; but it seems difficult in the extreme to get them to commit them to paper. Often and often have I hoped to see letters from artisans and craftsmen anent jerry-building. Every honest worker condemns the system, as I know from systematic inquiry whenever I get a suitable opportunity; but one would like to see it in writing. A large number of working men see the *BUILDING NEWS*, I am sure, and if they happen to peruse these columns this week, I trust they will give

a few moments' thoughts to the subject of the formation of earnest trade-guilds, having the object of attaining the greatest excellence in their work, knowing that it is impossible but that they must reap a rich reward in the shape of actual increased wages. You, Sir, would, I am sure, gladly print any communications such as I have mentioned.

Surely there must be men amongst us whose whole nature revolts at the levelling, crushing effect of trade-unionism, and who have a soul above the everlasting, unvarying monotony of working hours under such institutions? It is such persons who should break away from the fetters of a body which only has for its object the gaining of underserved hire for some, and the keeping of deserved remuneration from others. They should burst the bonds that bind them down to one unnatural level, and band themselves together with a far higher aim. They may feel confident that the mere formation of a society or company of carpenters, joiners, stonemasons, bricklayers, and other trades, with the object of doing earnest work, will assure their occupation from the first. They may not be "worshipful" companies, but they would be respected by architects and employers of labour. I do not look upon this project as being in the slightest degree Utopian. It seems to me eminently practical. All that is wanted is action on the part of those toilers who have recognised the great truth that no one can produce beautiful work who does not labour with actual enjoyment, interest, and enthusiasm. Much there is to arrange; but all problems of detail could be solved in time, providing that earnest men could be found to grapple with those difficulties which beset the first steps both of the smallest and of the greatest undertakings. GOTH.

## CHIPS.

An organ in the parish church of Llanymynech, built by Mr. J. Bellamy, of Denbigh, was opened on Friday last.

The secretary of the Local Government Board has forwarded an official note to the town clerk of Harrogate, sanctioning the loan of £29,500 for the purchasing, by the Corporation, of the Montpellier Gardens Estate; also the sum of £960 for the completion of the reservoirs; and £1,200 for the completion of the Valley grounds.

On Friday the new church of St. John was consecrated at Rogerstone, near Newport, Mon., by the Bishop of Llandaff. The church, the foundation-stone of which was laid in August of last year, has been built at a cost of over £2,000, from the designs of Mr. T. M. Lockwood, of Chester. The plan of the building is very simple—a nave with one aisle, a chancel, and a square-built tower on the south side, capped by a dwarf spire. The walls are of local stone in random courses, with dressed quoins. The porch is of timber, and the roofs are covered with tiles. The church was illustrated by two views in our issue of July 29, 1887.

On Saturday afternoon the daughter of the Mayor of South Shields set in motion a new clock which has been erected over the railway-station in that town. The clock has been manufactured by Messrs. W. Potts and Sons, of Leeds, and has two illuminated dials, 4ft. across, facing King-street and Mile End-road respectively. The clock-tower has been designed by Mr. W. Bell, of York, architect for the N.E.R. Company, and has been erected by Messrs. Wilson Brothers, of South Shields.

The new quarters to be built on Whittington Heath, Lichfield, have been commenced. They will accommodate thirty married soldiers, for whom at present there is no room in barracks. The site of the new quarters is at the corner of the heath, just beyond the grand stand. The building will have a frontage of 123 yards to the Barrack-road, and about 90 yards to the Tamworth-road, the total area being 10,304 square yards, or about 2½ acres. Mr. Wilson, jun., Manchester, is the architect.

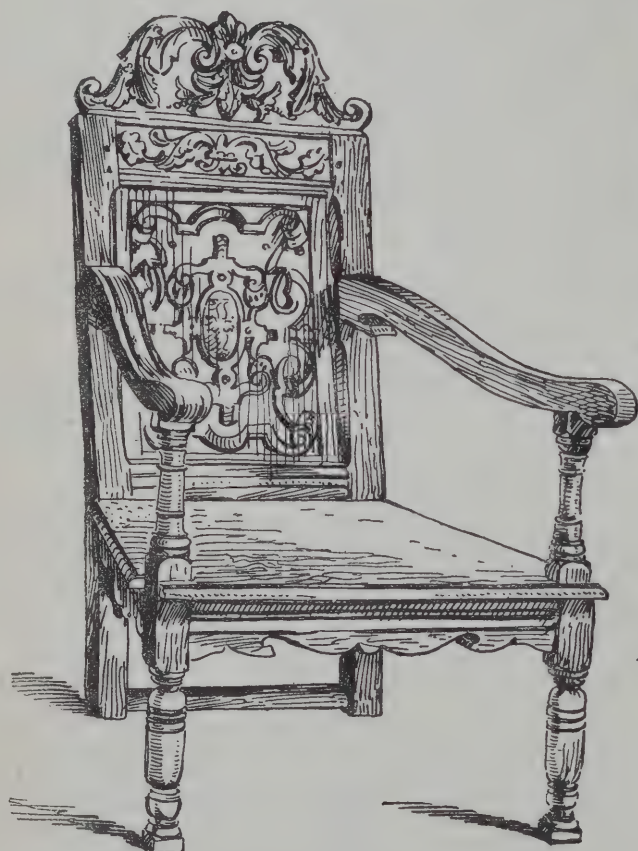
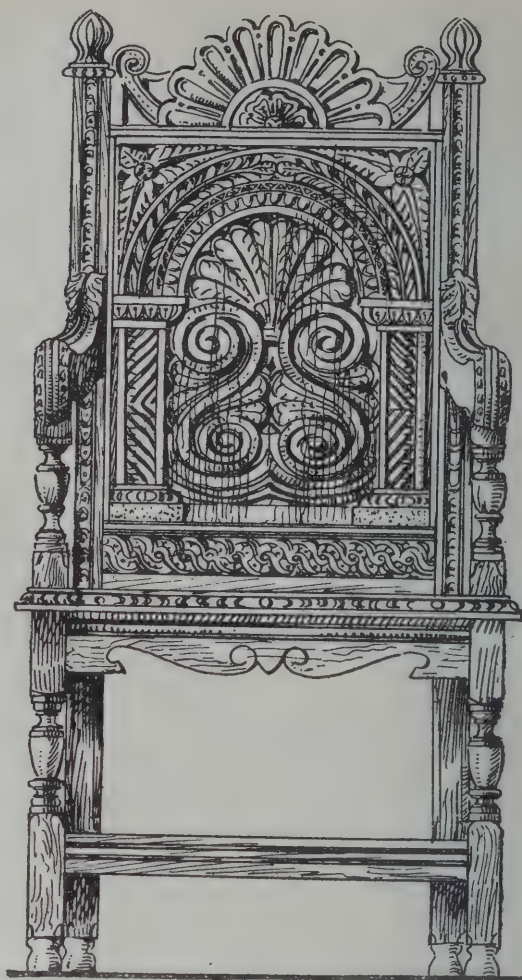
The Archbishop's Palace, Maidstone, having been bought as a memorial of the Queen's Jubilee by the townspeople, is now being restored, and the grounds laid out under the superintendence of Mr. Hubert Bensted. A new gateway, giving admission to the grounds on the side bordering the river Medway, has been built from the same architect's design.

The first section of the new church of St. Barnabas, Tunbridge Wells, will be consecrated by the Archbishop of Canterbury in October. Messrs. Catts, of London, are the architects.



PANEL IN MANTEL:

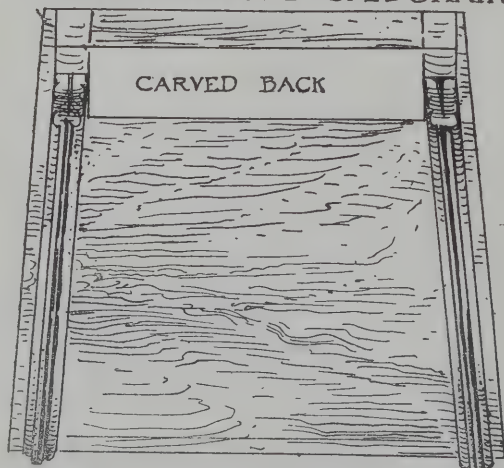
PIECE  
COUNCIL  
CHAMBER AT  
MUCH  
WENLOCK



OLD OAK CHAIR AT  
WENLOCK

CHAIRS & AT WENLOCK  
DRAWN BY  
H. V. LANCHESTER  
ALDWICKLE TRAVELLING  
STUDENT

SKETCH OF OLD OAK CHAIR



PLAN OF SEAT

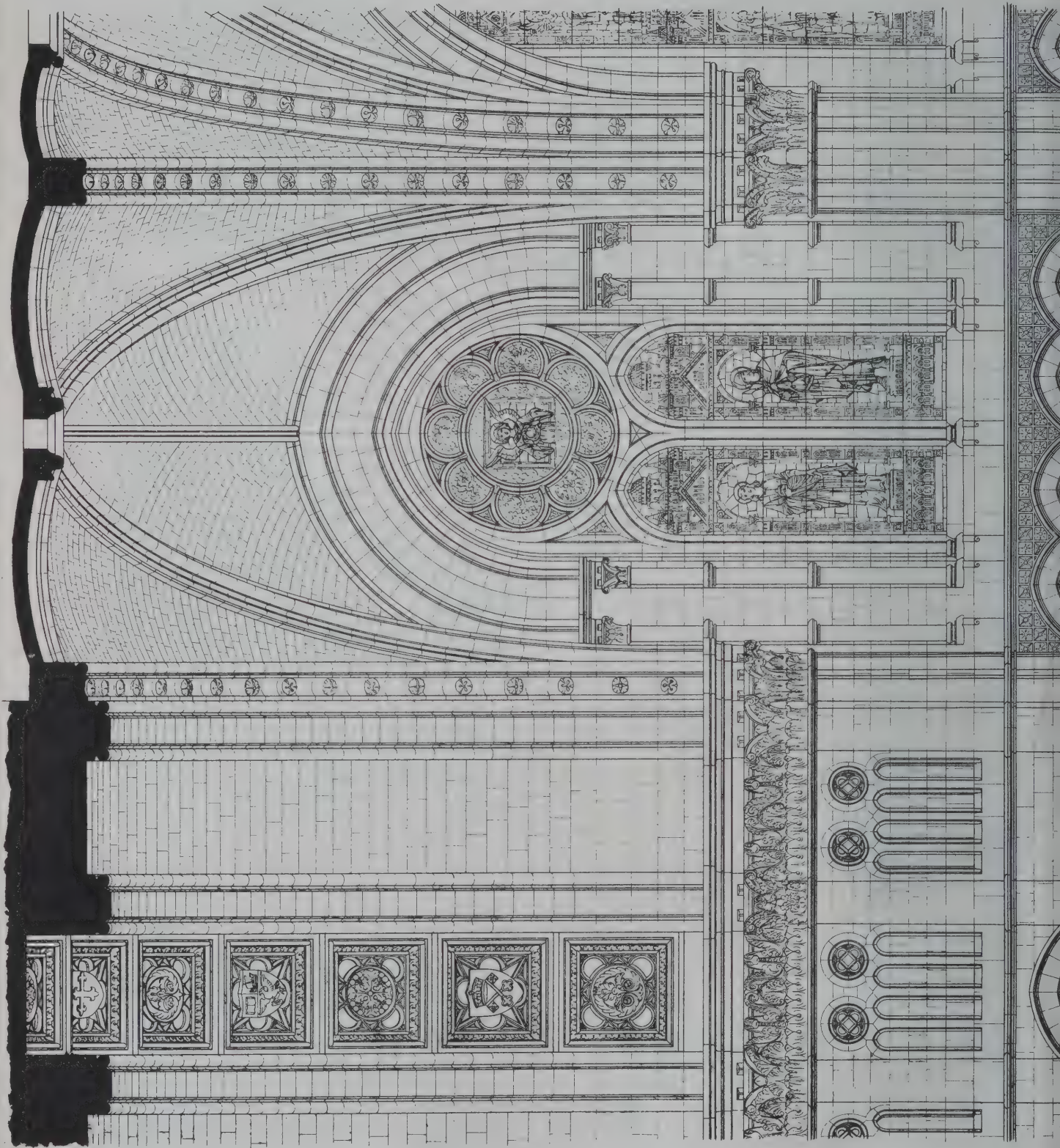


SIDE VIEW

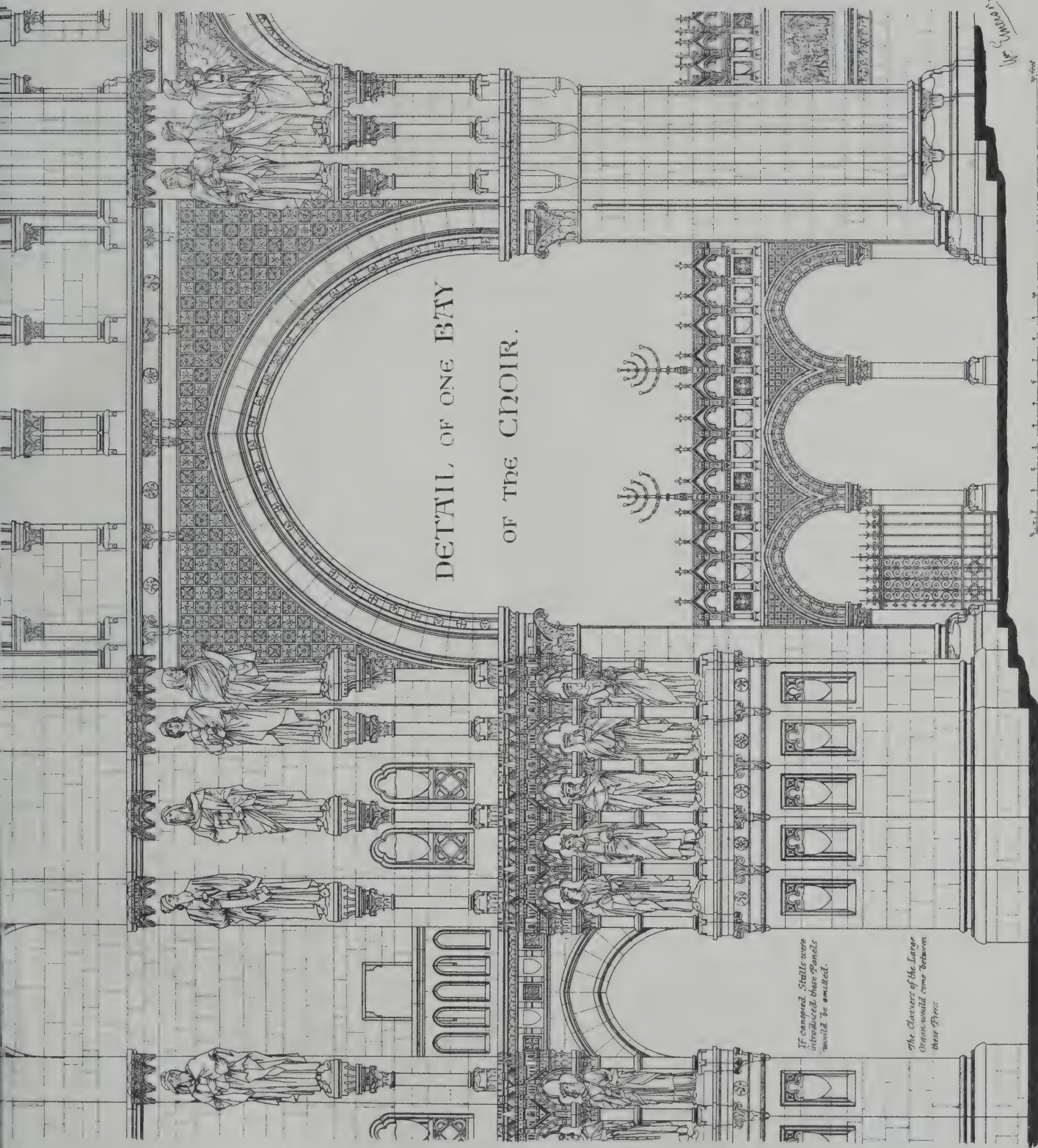












DETAIL OF ONE BAY  
OF THE CHOIR.

If cramped. Statues were  
introduced these panels  
would be omitted.

The Claviers of the Large  
Organ would come between  
these Piers.

Scale Two Feet to One Inch.

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.











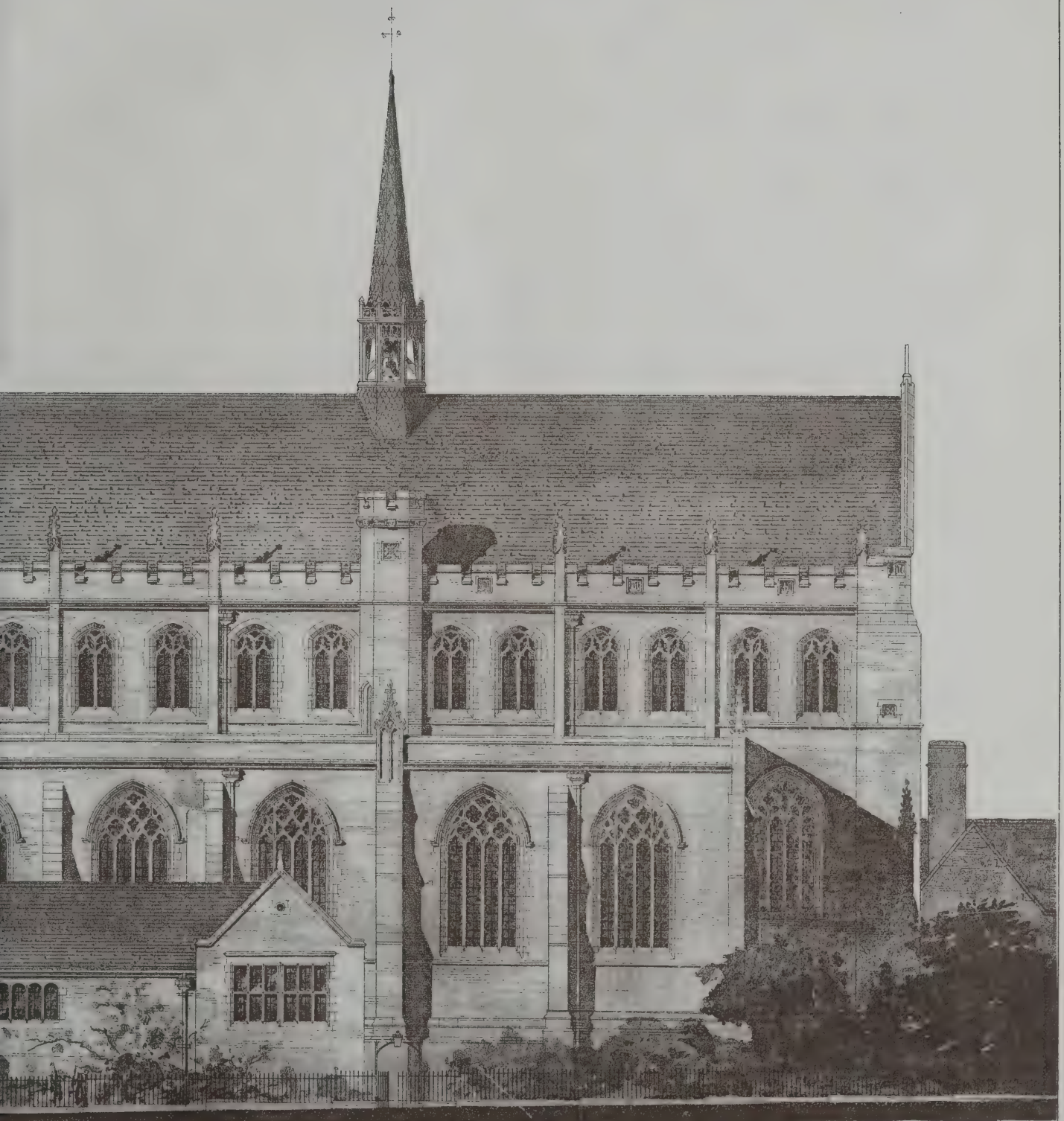




S. JULY 6. 1888.

CHURCH OF SAINT JOHN THE DIVINE GAINSBOROUGH

(Somers Clarke Junr  
J.T. Micklethwaite Junr  
is Deans Yard,  
Westminster.









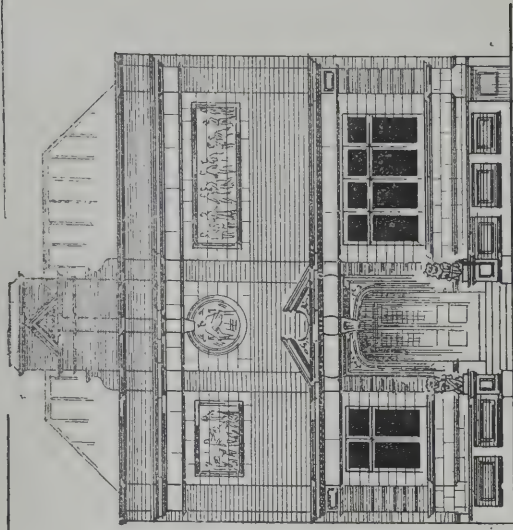
# "BUILDING NEWS" DESIGNING CLUB an Art School for a Country Town

Scale 10 5 0 10 20 40 Feet

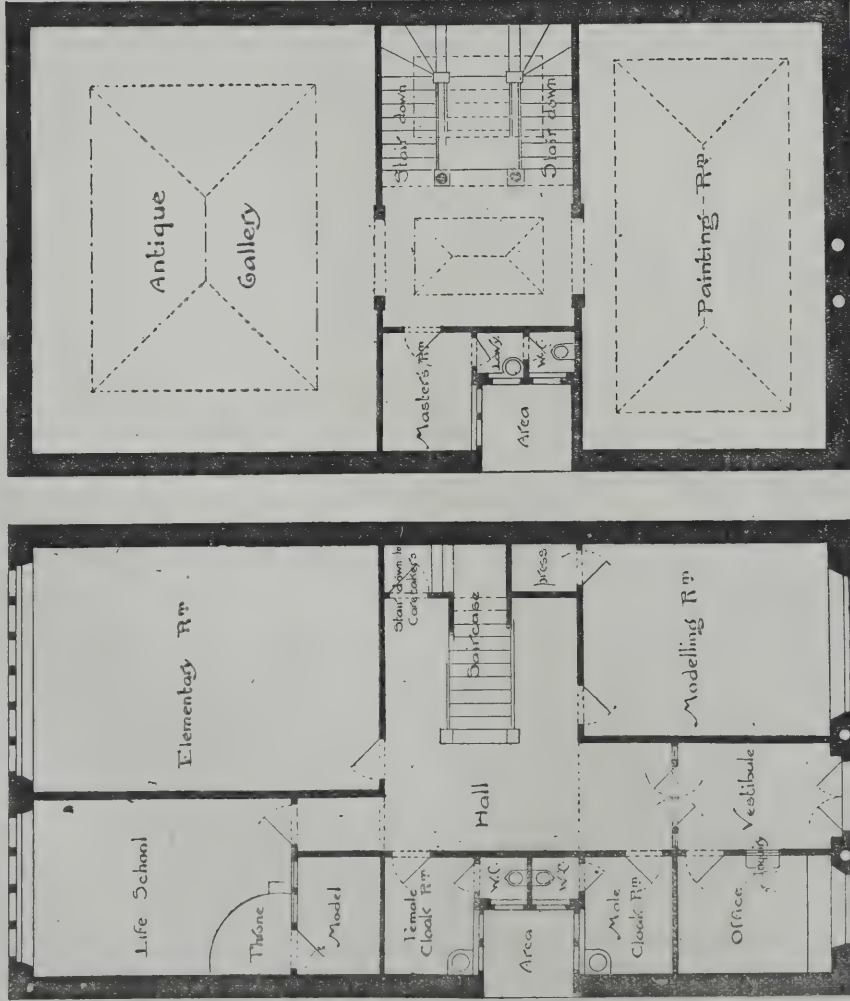
## "BOREAS"

NOTES— The Area at East side of Building to be built of White glazed Bricks.

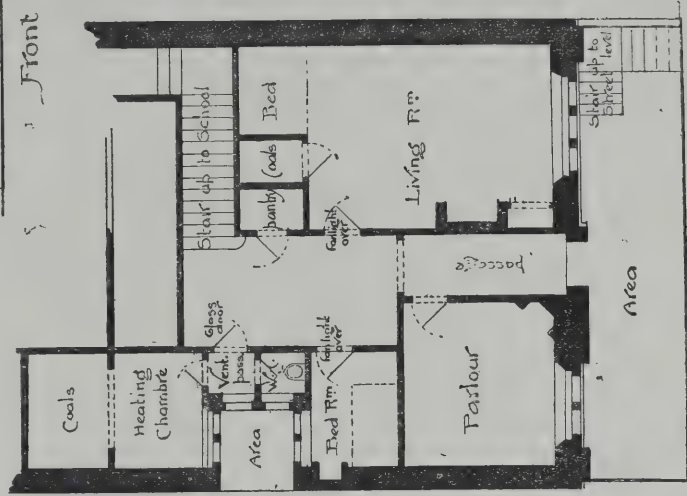
The Modelling Rm has been kept to the North for coolness. When the Buildings are devoted to Exhibition purposes the Deputy would serve as a boy office, and the landing at Stair-head would be suitable for Sculpture and Black & White Drawings.



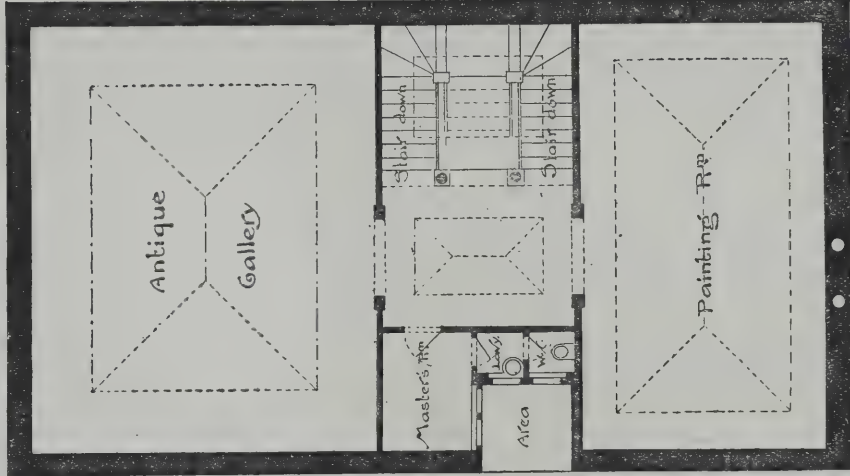
Front Elevation



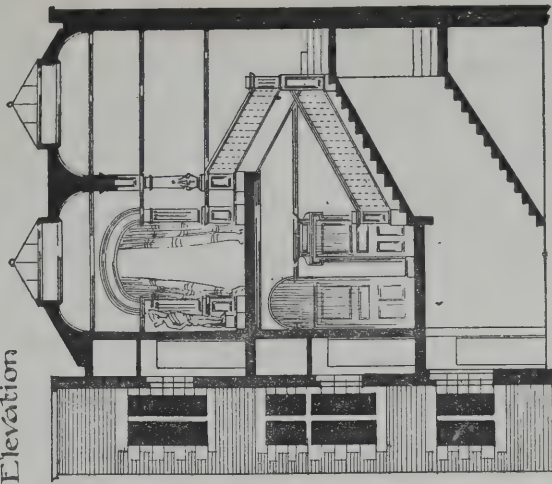
Ground Floor



Basement Floor



Upper Floor



Section

31<sup>st</sup> May 1888



# ARCHITECTURAL ASSOCIATION EXCURSION, 1888.

**D**ERBYSHIRE has been chosen for the annual excursion of the Architectural Association this year, and the week from August 13th to 20th has been settled upon; but as yet no definite details respecting the exact places to be visited have been determined. These will be arranged at a meeting of the committee next week. Matlock will be the head-quarters of the party.

The "fat things" which will anyhow constitute the chief part of the programme are Haddon Hall, Dorothy Vernon's love-sick home, where some may think a week well spent; Hardwick Hall, Lord Hartington's princely seat, completed in 1599, and which the old verse,

"... Hardwick Hall,  
More glass than wall,"

correctly describes in general characters; Bolsover Castle, renovated by "Bess of Hardwick" and finished by her grandson, the first Duke of Newcastle, in 1617; Wingfield Manor, built in the reign of Henry VI.—one of the earliest and finest examples remaining of a quadrangular mansion; Tideswell, "the Cathedral City of the Peak," hidden beneath the sheltering banks of Crewhook Dale, with its grand church; Ashbourne, a quaint old market-town north-west of Derby, where Dr. Johnson, temporarily tired of "the old Cock" in Fleet-street, loved to stay with Dr. Taylor, who gladly gave the great lexicographer a sincere and frequent welcome—here, "down thy slope, romantic Ashbourne, glides the Derby Dilly, carrying *six insides*"; Ilam Hall, four miles distant, is a beautiful Elizabethan mansion where Congreve wrote his "Mourning Bride"; Wollaton Hall, John Thorpe's masterpiece in Nottinghamshire, finished by the Smithsons about 1640; and Chesterfield, with its "crooked steeple," and places of interest in the adjoining district. Many a wayside stone-built farm-house and nestling, ivy-grown manor or cottage may possibly be searched out during the trip among the Derbyshire hills, rich as they are with the associations of legend and romance. The president, Mr. Herbert D. Appleton, F.R.I.B.A., will conduct the party. Owing to the nature of the roads the carriage journeys will have on this occasion to be reduced in number, and the places situated at considerable distances from the head-quarters will be reached, of course, by rail. The number of the party is fixed at thirty-four as an outside limit.

## CHIPS.

The new sanatorium, Eastbourne, is being warmed and ventilated throughout by means of Shorland's patent Manchester grates and Manchester stoves, supplied by Mr. E. H. Shorland, of Manchester and London.

The memorial stone of new premises for a Liberal Club were laid at Whitefield, near Manchester, on Saturday. The building, which will cost about £1,200, is being erected from designs by Mr. Thorp, of Whitefield.

It is asserted that the Midland Railway Company contemplate constructing a railway between Norwich and Leicester, *via* Stamford and Bourn, at an estimated cost of about £550,000.

On Friday, Sir E. W. Blackett, Bart., of Matfen, laid the corner stone of a new church at Henshaw, near Bellingham. The church, which has been named All Hallows (Bishop Ridley Memorial), has been designed by Mr. Johnson, of the firm of Austin and Johnson, Newcastle-on-Tyne. The church is in the Early English style, and consists of a nave, chancel, and vestry, with a porch at the west end. The estimated cost is between £1,200 and £1,300.

New local board offices have just been completed at East Grinstead. The buildings consist of a board room 28ft. by 18ft., with office for surveyor, and waiting room, and adjoining is a residence for the surveyor. The walls are faced externally with red local bricks with Bath stone dressings, and the roofs are covered with Broseley tiles. The works have been carried out by Messrs. Charlwood Bros., of East Grinstead, at a total cost of £758, from the designs and under the superintendence of Mr. W. N. Martin, of Wimbledon.

A new Congregational church in Crescent-road, Beckenham, Kent, was opened last week. It seats 600 persons, and has cost £11,500, with the adjoining schoolroom. Mr. Beaumont was the architect, and Mr. Holloway the builder.

# Building Intelligence.

**BRINDLE, NEAR CHORLEY.**—The old parish church of Brindle was reopened on Sunday last, after restoration. Some time ago the galleries in this church were considered unsafe, and Mr. James Bertwistle, F.S.I., architect, of Blackburn, who was called in, found that the whole of the beams were decayed with dry-rot. It was immediately decided to close the galleries and entirely remove them. This has been done, and the whole interior of the church has been decorated. The exterior has been restored and pointed, and the old window on the ringers' floor in the tower, which was fast crumbling away, has been replaced by a new one. The whole of the work has been executed under the personal supervision of Mr. Bertwistle.

**CREDITON.**—The nave and aisles of the parish church of Holy Cross were reopened on Sunday week for divine service. The square box pews have been removed and replaced by good open oaken benches, with carved traceried ends of Perpendicular treatment, floors under seating are paved with solid oak block, laid in double herring-bone 2in. thick. The aisle is tiled with Godwin tiles. The masonry of the piers, which had been much ventilated, has been made good, the whole floor of nave lowered to its original level, and the bases of piers opened up. The tower bases were found to be late Norman. An oak lobby and outer doors placed in the south porch, and the old font refixed in the south aisle. Messrs. Hayward and Son, of Exeter, were the architects, the work being intrusted to Mr. W. Dart, contractor, Crediton; Mr. W. Berry carrying out the masonry.

**HUCKNALL TORKARD.**—This parish church, wherein lie the remains of Lord Byron, has been enlarged and restored at a cost of £1,500, from the designs and under the superintendence of Mr. Robert C. Clarke, architect, Nottingham. The enlargement took the form of N. and S. transepts, the chancel being taken down and rebuilt (stone for stone) one bay eastward; the nave roof was taken off and a clerestory built over the nave arches; the tower, which was in an unsatisfactory condition, has been carefully underpinned with cement concrete. The Byron slab has not been touched, and the memorials have been refixed in their original positions. The works have been executed by Messrs. Fish and Son, Nottingham, under the direction of Mr. William Harris, who acted as clerk of the works.

**THE IMPERIAL INSTITUTE.**—At a meeting of the organising committee of this institute, held on Monday, it was reported that the actual funds now available, exclusive of subscriptions from the Indian Empire and temporarily invested there, amounted to £310,000. The amount of the endowment fund is fixed by the new charter at £140,000. The foundations for the main buildings were reported as having been completed in May last at a cost of £6,000. On the recommendation of the building sub-committee, the tender of Messrs. Mowlem and Burt for the making of the new road to be known as the "Imperial Institute-road" was accepted at the sum of £5,825. The same firm's tender for the main buildings, exclusive of the central and eastern and western towers, was accepted from a list of 15 competing contractors, the amount of the tender being £142,800.

**LICHFIELD CATHEDRAL.**—In commencing the restoration of the south window of the Lady Chapel last week it was discovered that the mullions, apparently of stone, were nothing more than Portland cement, plastered round an iron core, which, by rusting, had so disintegrated the cement that on being touched it crumbled away. This was the case with all the mullions save the centre one, which was of inferior stone and not of the same nature as the rest of that part of the cathedral, whilst the mouldings were inferior in design. This incongruous work was probably executed at the end of the 18th century, when so much of the other bad work was done. The work of the restoration of the east end is progressing slowly, and three windows have been taken out and replaced, including the east window. New figures have been placed in two southern buttresses of the Lady Chapel, and the stone-

work on that side generally restored under the care of the dean. The dean has arranged for the niches in the restored buttresses to be occupied by figures of female saints from the Old and New Testaments. In the upper niches will be placed the Old Testament figures, and in the lower the New Testament figures. In the buttresses already restored at the south and south-east angle of the Lady Chapel the figures placed are those respectively of Rachel and Phoebe, and Miriam and Lydia; whilst in the buttress further eastward the figures of Deborah and Martha are about to be placed. In the buttress now undergoing restoration the figures are to be those of Rebecca and Elizabeth.

**TROON.**—The foundation-stone of the new U.P. Church at Troon was laid on Saturday. The new church is situated in St. Meddan-street, the principal front facing the south, and the east elevation extending along Church-street. The buildings are designed in the Decorated Gothic style. The church will have a tower and broach spire rising to a height of 120ft. above the ground. At the north end the choir and organ-chamber is carried out in chancel form, and the hall, with a semi-octagonal front, forms a feature in the grouping. Internally, the church is divided into a nave and side aisles. The ceiling is semi-octagonal in form, with arched main couples. There will be galleries over side aisles and also at the end, and the pulpit is placed under a moulded arch at the north end, the organ-loft and choir being placed in the chancel behind. Sittings are provided for 660 persons, and besides a vestry and ladies' room, there is also a hall for 120 persons. The buildings are being erected from the designs of Mr. John B. Wilson, A.R.I.B.A., Glasgow, whose design was selected in competition. The contractors are—Mason, Orr, McLean, and Co.; Wright, James Ralley; plumber and gasfitter, D. Walker; plasterer, A. McSkimming and Son; all of Troon; slater, W. Darrie, Glasgow. The total cost will be about \$3,000.

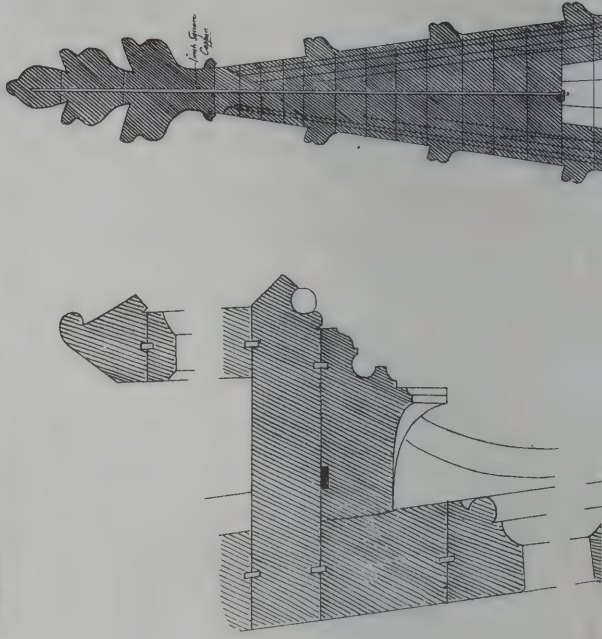
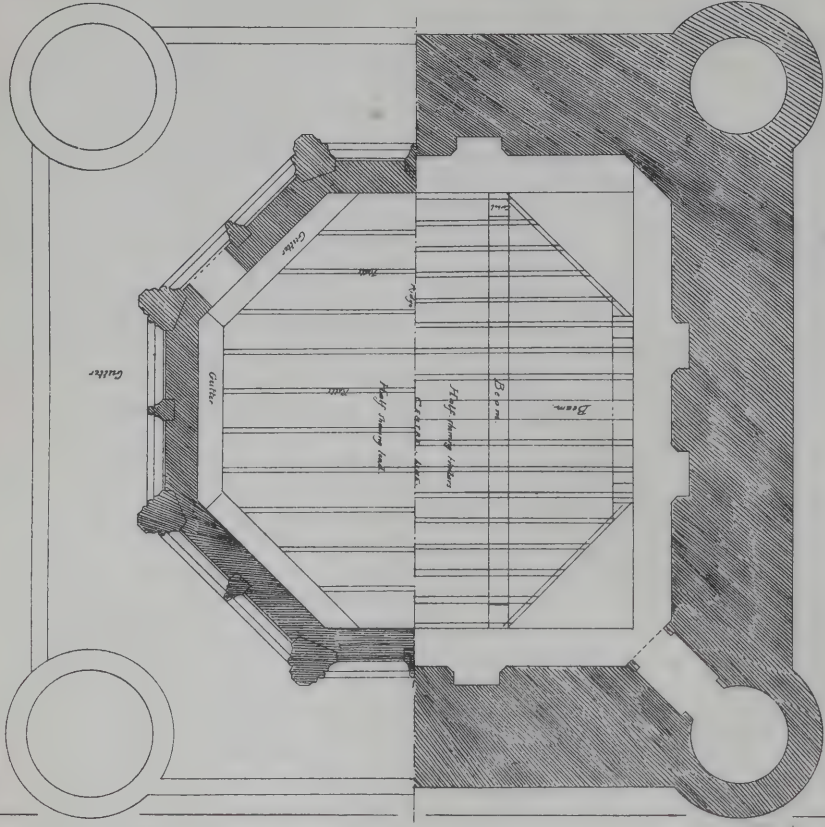
**THEOBALD'S PARK, CHESHUNT.**—The extensive additions and alterations at Sir Henry Meux's, Bart., place at Theobald's Park are approaching completion, and the scaffolding is being now all cleared away from the new parts. The additions have been carried out from the designs of Mr. Charles E. Ponting, of Lockes-ridge, Marlborough, architect to Sir Henry's various estates. The whole of the new work is in style Queen Anne; it is executed in brick-work, and for the dressings brown bed Portland stone is employed. The new tower is carried up to some considerable altitude, and is surmounted by a cupola, whose ogee outlined high-pitched roof is covered with lead, and crowned by a wrought-iron vane of hammered metal. The lantern-like cupola has its side panels all around prepared for enrichment with scraffits, swags, grotesque figures, &c., in stucco work, and this will be done by Mr. Harry Hems, of Exeter, who is also carrying out all the sculptured work in stone and brick throughout the new wings. A feature on the upper part of the tower is a series of panels forming a frieze 3ft. deep around the entire girt. These panels are of red brick richly carved, the motif being the work at Hampton Court Palace. All the exterior woodwork is painted white, and the roofs are covered with blue slates. Mr. Elliott, of Newbury, is the contractor for the works, Mr. Western being his representative on the spot, and Mr. Johnson is the clerk of works. The task of re-erecting old Temple Bar as one of the gateway entrances to Theobald's goes on apace, and this work will probably be finished in about a month. The contractor has found much of the original stone missing, and if Sir Henry Meux had not rescued it when he did it would probably, bit by bit, have all gone piecemeal away ere many years more had passed.

A Jubilee drinking-fountain and monument on Stock's Hill, Ketterton, Butlandshire, was inaugurated on the 21st ult. The engineering was carried out by Mr. Molesworth, the excavating superintended by Mr. E. Nutt, and the erection of the monument was the work of Mr. Geo. Hibbins. The monument, which is of Ketton stone on a base of York slabs, stands 13ft. high. The octagon base is 7ft. 2in., and the shaft is 3ft. square, finished at the top with a ball terminal.

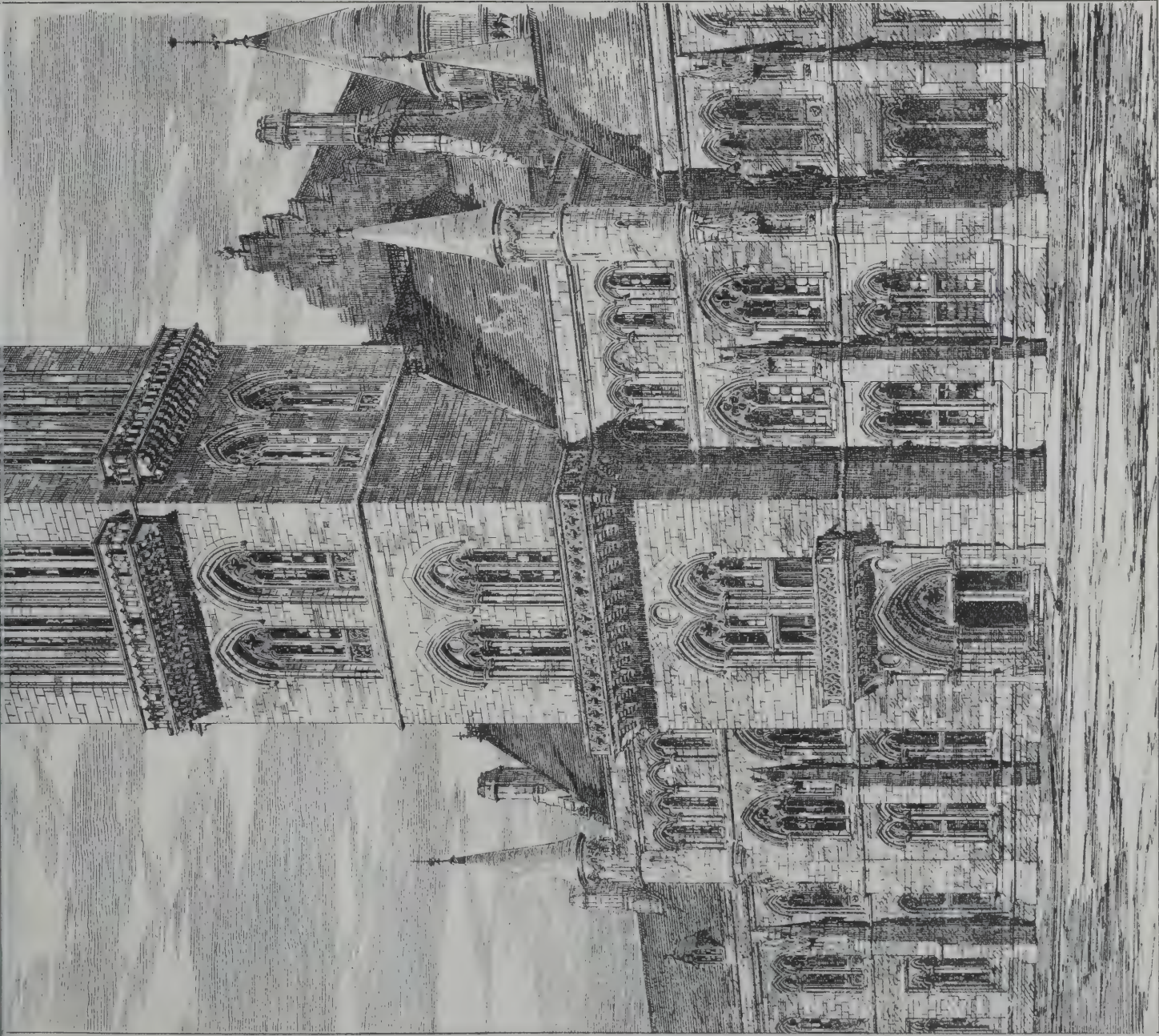




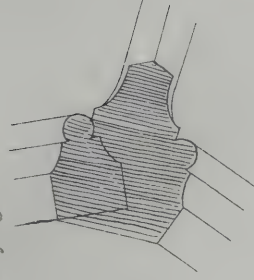




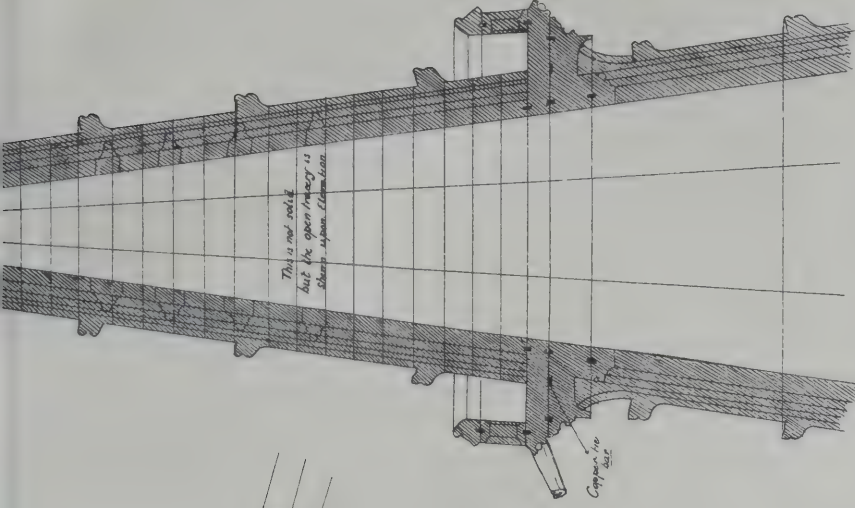




Plan of angle

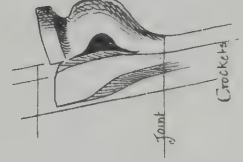
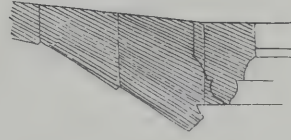


## DETAILS



This is not solid  
but the opening is  
filled up with  
stone.

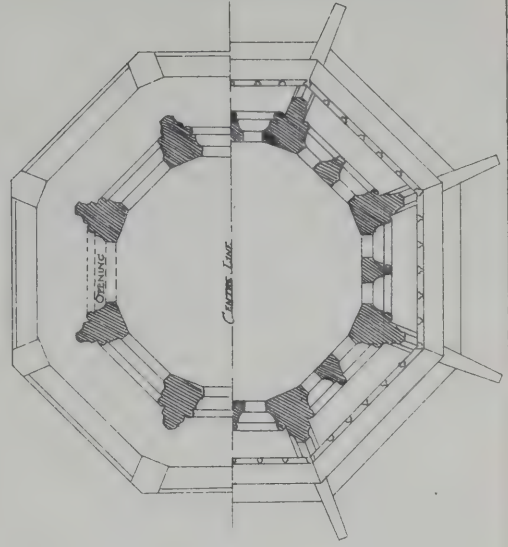
Croquet  
Joint



Joint

Croquet

## SECTION



Opening

Center Line







## Engineering Notes.

**ASSOCIATION OF MUNICIPAL SURVEYORS.**—The annual meeting will be held in London on Thursday, Friday, and Saturday, in next week, the Institute of Civil Engineers, 25, Great George-street, Westminster. On the first day, Thursday, the general meeting will be held at noon, when the annual report will be read and the President's address delivered. At 2.30 p.m., papers will be read on "Back Streets, Lanes, and Alleys," by Mr. H. U. McKie, of Carlisle; "Average Meter System," by Mr. G. R. Archamb, Chelsea; and "Ten Years' Experience of the Shone System," by Lieut.-Col. James, V.C., Wrexham. The drainage works at the Houses of Parliament will be visited afterwards. On Friday morning Messrs. Jennings' works at Stangate Wharf, Lambeth, will be visited, and the meetings will be resumed at 1.30 at the Institution of Civil Engineers, when the papers to be read are: "Electric Fire Alarms," by Mr. T. De C. Meade, Hornsey; "Water Supply," by Mr. W. Santo Crimp, Wimbledon; and "The Purification of Sewage by Electricity," by Mr. W. Webster, F.C.S. In the afternoon visits will be paid to the Lucigen Light Works (Page-street, Westminster), and John's Oxygen Works, Westminster, and the new Battersea Bridge Works. On Saturday members will embark on board a steamer kindly provided by the President, Mr. E. B. Alice-Clark, at the Temple Pier, and proceed down the river, inspecting the Tower Bridge, the Greenwich Ferry, where Mr. J. Standfield, M.I.C.E., will explain the works; and the new Outfall Works at Barking, where Sir Joseph Bazalgette, C.B., will receive the members and explain the works.

**MANCHESTER SHIP CANAL.**—A Select Committee of the House of Commons has passed the preamble of the Bill recently introduced by the Manchester Ship Canal Company. By this Bill the Company are empowered to make an important deviation of their authorised canal from Barton-upon-Irwell to its termination in Manchester, the effect of which will be to increase the water space by 14 acres, the quay space by 69 acres, and the quay frontage by nearly 2 miles, while the actual saving in expenditure will amount to £12,588.

**RIVER WITHAM DRAINAGE: OPENING OF THE NEW OUTLET AT HOBHOLE SLUICE.**—The new outlet constructed for the General Commissioners for Drainage by the River Witham for the more effectual drainage of the Fourth District has just been formally opened. On the completion of the new outfall channel to Clayhole, which not only dried the sills of the Hobhole sluice but effected a depression of 5ft. 6in. in the low-water level at Hobhole, it became evident that for the Fourth District of the Witham Drainage, enlarged and lower outlet would be absolutely necessary. The General Commissioners promoted a Bill in Parliament and obtained the necessary powers in 1887. With the addition of the new outlet just opened the sluice has now four openings each 15ft. wide, but the sill of the new opening is 3ft. lower than the old sills. This additional outlet will materially improve the natural drainage of the Wildmore, West, and East Fens. The foundations of the new works were carried down to a bed of hard clay 10ft. below the level of the old sills. The floor is 130ft. in length, formed of Portland cement concrete, and the sill quoins and copings are Derbyshire stone. The side walls are brickwork and concrete combined, with blue Staffordshire facing, and their maximum height from foundation to cope is 33ft. The central portion of the chamber carries the sea-bank, and is constructed in tunnel section 15ft. in height for a length of 68ft. The doors are constructed of English oak, with wrought-iron straps and bolts, and the land door is raised and lowered by a crab with double racks and pinions. The works throughout have been carried out from the designs and under the superintendence of Mr. J. E. Williams, M.I.C.E., by Mr. Samuel Sherwin, contractor, of Boston, who was represented on the works by Mr. Thomas Barwell.

**THE FORTH BRIDGE.**—Major-General Hutchinson and Major Marindin, of the Board of Trade, in their quarterly report, published on Saturday, of their inspection of the works

in progress for the construction of the Forth Bridge, say that the progress made during the quarter was most marked. The amount of additional steelwork which has been riveted is largely in excess of that recorded in any previous quarter. The character of the work is, to all appearance, of the same high class as heretofore, all the appliances for carrying it on have been thoroughly tested, and a regular mode of procedure, with which the workmen are every day becoming more and more familiar, has been finally adopted.

### COMPETITIONS.

**AINTREE.**—Mr. W. P. Hartley, who recently received 85 competitive designs for laying out his proposed model village at Aintree, has examined them, with the aid as assessor of Mr. J. F. Doyle, architect, Liverpool, and has selected the three prize designs. As the first two were equal in merit, though differing in excellence, each will receive an award of 50 guineas, the value of the first prize. The design chosen was that sent in by Messrs. W. Sugden and Son, Leek, and the one equal in merit came from Mr. Frank Mee, King-street, Manchester. The third prize (20 guineas) was awarded to Mr. W. E. Willink and Mr. P. C. Thicknesse, Lord-street, Liverpool.

**EDINBURGH.**—The town council of Edinburgh recently resolved to erect a memorial statue to the late Dr. William Chambers. Designs were invited from sixteen sculptors resident in Edinburgh and Glasgow, but only six have responded, and their models are on view this week at the Royal Scottish Academy Galleries at the Mound. The town council have asked Mr. T. Brock, A.R.A., London, to act as their artistic assessor. The schedule sent out to artists specified that the memorial is to consist of a statue not less than 10ft. 6in. high, on a pedestal not less than 15ft. high, and is to be placed in the centre of Chambers-street, opposite the principal entrance to the Museum of Science and Art. The statue is to be of statuary bronze, consisting of nine parts of pure copper to one of pure tin; not less in thickness than 3in. at any part, and thicker where the parts have to sustain weight. The pedestal is to be of best Aberdeen or Peterhead granite. The models are expected to be one-fourth of the full size, and to each model there will be a distinctive motto. The author of the design judged first in the order of merit will be employed to carry the work into execution; and premiums of £50 and £25 are to be awarded to the authors of the designs judged second and third in merit respectively. The whole cost, including statue, pedestal, and foundation complete, is not to exceed £1,250.

**GLOUCESTER.**—The town council met on Tuesday in committee of the whole house in reference to the baths question, for which it will be recollected they recently awarded the first premium to Mr. J. F. Trew, of that city. Mr. Trew was appointed architect, and it was stipulated that £6,000 was not to be exceeded. But the architect was required to make certain modifications in his proposals, and when the tenders were sent in it was found that the lowest was some £2,000 or more in excess of the stipulated £6,000. The Baths Committee then revised the specification, and amended tenders were sent in, the lowest being £7,500. This the committee recommended for acceptance; but this was opposed, and the matter was referred to the whole council in committee. On Tuesday, after two hours' discussion, there was an equal division as to the acceptance of the tender and as to the enlargement of the committee, and as the mayor declined to give a casting vote, the whole matter has been again referred to the council.

It is reported in the Lynn papers that the foundations of St. Mary's (R.C.) Church, on the London-road in that town, have given way, and that the building will have, it is supposed, to be entirely taken down. It is constructed of brick in the Geometrical Decorated style, and was erected in 1845 from a design by the late Mr. A. W. Pugin, at a cost of about £2,000.

Lord Hartington will preside at the annual meeting of the National Association for the Promotion of Technical Education, which is to be held at the rooms of the Society of Arts to-morrow (Saturday).

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLII., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., LI., LII., and LIII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—A. S. and S.—T. C. D.—E. A. and Son.—A. C. and Co.—M. H. L. B.—C. S. and P.—R. D. Co.

M. A. (There are two societies for clerks of works, on buildings and estates respectively. The one is the Clerks of Works Association, Mr. F. Dashwood, 38, Grosvenor Park-road, Walthamstow, secretary; the other the Society of Estate Clerks of Works, Mr. Thomas Potter, Assoc. S.A., Alresford, Hants, secretary.)—STUDENT. (Better apply to the secretary, at 9, Conduit-street. You may possibly get the information there.)

### "BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"H.M.S. Conway" "Bee," "Twig" "Launcelot," "Mayfly" "Old Gold," "Lawton," "Ghost," "Scottish Renaissance," "Uncouth Swain."

CHUZZLEWIT. (Your design for a school of art, which was lost in the post, has now reached us without the address label, and no name on the back as required by our rules. The plan would have ranked among those placed third. It is overweighted by too large a hall, and by a badly-lighted antique room, with only one end window. The elevation is very poor, and is not well drawn. Send your name and address.)—J. MARTIN SMITH. (The second design for the school of art is given to-day. See review last week.)—WILLIAM YOUNG. (Yes, the gardener's cottage is the last subject for the present series.)

## Correspondence.

### THE ST. GEORGE'S VESTRY BATHS AND WASHHOUSES COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—Will you kindly find room for the enclosed correspondence in your journal?—I am, &c., JAMES WEIR.

9, Victoria Chambers, Westminster, S.W.,  
July 3.

[COPY.]

9, Victoria Chambers, Westminster, June 5, 1888.  
To the Vestry of St. George, Hanover-square,  
re New Baths and Washhouses.

GENTLEMEN,—I have been requested by some of the architects who were invited to compete for the above to express their feeling of dissatisfaction with regard to your decision in the above competition.

The competitors were assured in the instructions from the Commissioners that an architect of established reputation should act as assessor, and as in the cases of the



Admiralty and War Office, the Law Courts, the Glasgow Town Hall, the Manchester Town Hall, and all public competitors, this was understood to imply that the assessor's decision was to be final and binding, unless some just cause could be assigned for acting to the contrary.

The competitors are surprised to find from the Commissioners' report that they have rejected the design which the assessor selected, and, moreover, have declined to produce his report.

And further, that the design selected by the Commissioners, according to their own statement, is defective, and will require "to be considerably elaborated and a few modifications" made in it.

They are also surprised that, as the selected design cannot be carried out for the amount stipulated in the instructions—viz., £30,000—that this fact of itself did not disqualify it.

As the competition has entailed a large expenditure of time and labour on the competitors, they respectfully request that you will, in justice to them, reconsider your decision and act on the assessor's award, and also publish his report.—I have the honour to be, Gentlemen, yours obediently,

JAMES WEIR, F.R.I.B.A.

[COPY.]

St. George, Hanover-square (Commissioners for Public Baths and Washhouses).

1, Piccadilly-road, S.W., 29th June, 1888.

SIR,—Your letter, dated 5th inst., addressed to the Vestry was read to the Commissioners at their meeting yesterday, and I was instructed to inform you that the Commissioners see no reason to take any further action in the matter.—I am, Sir, your obedient servant,

(Signed) F. W. DOGGETT, Clerk.

James Weir, Esq., 9, Victoria-chambers, Westminster, S.W.

### OUTLINE SPECIFICATIONS.

SIR,—Many architects, especially those connected with boards or companies, have from time to time drawn up outline specifications and had them printed for their own use. I have examined several such specifications, and found them far from perfect; but the advantages of the practice are so obvious that I would suggest an interchange of ideas on the subject in your columns, with a view to the compilation and publication of a general outline specification, containing all the common clauses of each trade, and enumerating the variable matter in its proper order. In this way the peculiarities of individual opinions might be eliminated, and the foundation of a canon of common construction laid, freed from the absurd tautology of obsolete practice, and recognised and available by all the profession.—I am, &c.,

J. HOWARD PENTLAND, B.A., B.E.

### CHIPS.

The London correspondent of the *Liverpool Mercury* asserts that Mr. Whistler is about to marry the widow of the late E. W. Godwin, and adds, "Mrs. Godwin, who was, for only a few years, the wife of the most serious conversationalist of his day, now becomes the mate of the conversationalist whose witty faculty never leaves him time for serious talk."

A parish hall was opened at Llanelly on June 26. Mr. Buckley Wilson, F.R.I.B.A., architect, Swansea, designed the building, comprising a hall 72ft. by 35ft., which is entered by a narthex the whole width of the building, and 7ft. wide. There is also a committee room 13ft. by 25ft. 6in., and a tea room.

Sunday schools are about to be added to the Wesleyan Chapel in Dagnall-street, St. Alban's, from plans by Mr. James Weir, of Westminster.

One of the longest tunnels in the world is that at Schemnitz, Hungary. It has a length of 10·27 miles—1 mile longer than the St. Gothard, and 2½ miles more than the Mont Cenis Tunnel. When the contract was made, in 1872, the work was let at about £7 sterling a yard, but for some years before its completion the cost was about £22 a yard.

Foundations of a Roman building have just been discovered in the rectory garden at Ebchester. The debris turned up include Romano-British pottery, a millstone, and animals' bones.

The ceremony of laying the foundation-stones of the new Wesleyan Sunday schools and morning chapel in the rear of the Wesley Chapel, St. Helen's, took place on Friday. The new buildings will consist of a morning chapel, eight classrooms on the ground floor, eight classrooms on the first floor, with infants' room, heating cellar, and kitchen. Messrs. Isitt and Verity, of Wigan and Bradford, are the architects, and Mr. William Harrison, Cotham-street, St. Helen's, the builder, and the cost of building and furnishing will be about £3,000.

The London and North-Western Railway Company contemplate erecting extensive docks on the river Dee, and surveyors have been engaged examining the river for that purpose.

## Intercommunication.

### QUESTIONS.

[9678].—**Damage by Vibration of Steam Roller.**—A Corporation having a 16-ton steam road-roller has had notice of an action for damage alleged to have been caused by vibration of a house owing to the roller passing and causing a mirror to fall, which displaced and broke several chimney ornaments. The damage is assessed at £20. Would any reader say if they have knowledge of any similar action, and, if so, would they kindly give particulars of same?—LANCASHIRE.

[9679].—**Copies of Plans—Conditions of Contract.**—Would some one of your readers kindly inform me how the following works? Conditions of builder's contract, as approved by the R.I.B.A. and London Builders' Society. Art. 4.—Complete copies of the drawings and specification, signed by the architect, are to be furnished by him or by the measuring surveyor to the contractors for their own use, and the same or copies thereof are to be kept on the buildings in charge of a competent foreman, who is to be constantly kept on the ground by the contractors. . . . Schedule of rules for practice and charges of architects, R.I.B.A.—"The following are the professional services included in the ordinary charge of 5 per cent.:- . . . preliminary sketches. Detailed drawings . . . One set of tracings and duplicate specification . . ." As it is necessary that the architect should have the original plans and specification, and that the clerk of works should have duplicates, how is the architect remunerated for the third set of copies which the R.I.B.A. and the Builders' Society say should be provided by the architect to the builder?—X.

[9680].—**Stone-Breaking Machine.**—Will any of your readers please say which is the best stone-breaking machine in the market?—A ROADMAN.

[9681].—**Diameter of Columns.**—A large shed of 90ft. span is proposed to be roofed by an iron roof in two spans of 45ft. each. The trusses are to rest on two external walls, and be supported in the middle on iron columns. What should be the diameter of these columns, if hollow and 50ft. high, and what is the best method by which the trusses can meet on top of the centre columns, allowing for expansion and contraction? What should be the thickness of the outer walls?—ROOFING.

### REPLIES.

[9676].—**Dry Rot or What?**—Undoubtedly dry rot. Nothing less than clearing out the parts affected, and far beyond, so as to leave no doubt that every particle of the rot is eradicated, and giving complete ventilation, will be of any use. A weak solution of vitriolic acid as a wash is recommended by G. Wilt, and I have used it with good results—i.e., washed over the parts not already infected and so preventing the spread of the disease. Heat, with moisture, and imperfect ventilation will rapidly develop dry rot.—WILLIAM A. GOSS.

On Friday afternoon the Rev. Dr. Jowett opened a new gymnasium which has been erected at the Leamington High School for Girls, the Parade. The gymnasium, which was designed and built by Mr. Fell, is a lofty room, 60ft. by 30ft. It is constructed of iron, lined inside with match-boarding. As the new building will be used not only as a gymnasium, but also as an assembly room, a platform has been constructed at the eastern end. The gymnastic fittings were selected and put up under the direction of Mr. Hubbard, director of the Birmingham Gymnasium. Hot-water pipes have been put into the room.

The clock tower erected at the junction of Queen's-road, West-street, Western-road, and North-street, Brighton, at the charge of Mr. James Willing as a jubilee memorial, was formally unveiled on Friday, and handed over to the municipal authorities. It has been built, from designs by Mr. John Johnson, selected in competition, by Messrs. Campbell. The materials are Portland stone and Peterhead red granite for columns, the latter being supplied by Messrs. J. Whitehead and Sons, of the Granite Works, Aberdeen. The clock dials, four in number, are 5ft. in diameter, and the face of the clock is illuminated at night by electric light. A time ball and vane surmount the spire.

On Sunday week the Webberley memorial window in St. James's Church, Longton, Staffs, was unveiled and dedicated. The window consists of two large lights, and the subject selected is "The Angel announcing the Resurrection of our Blessed Lord to the Holy Women." The angel in the left light is shown seated on the tomb within the sepulchre, and with uplifted arm announces the tidings to the three holy women occupying the other compartment. Behind the angel in the distance is seen the Hill of Calvary, with the crosses, emphasised by the rising sun beyond. The picture is framed with an architectural canopy and base elaborate in detail, these being mostly white and gold. In the large piece of tracery is depicted an angel holding a scroll. The window was designed and executed by Messrs. Heaton, Butler, and Bayne, 14, Garrick-street, London, who have also two other windows of a similar kind in hand for this church.

There is now on view at the Bethnal-green Museum a collection of Dresden china, silver plate, furniture, and other art objects lent by the Hon. W. F. B. and Mrs. Massey Mainwaring.

### LEGAL INTELLIGENCE.

IN RE WILLIAM DOUGLAS.—The bankrupt, who had traded at South Kensington and Chelsea as a builder and contractor, applied to Mr. Registrar Brougham, on Friday, for an order of discharge. The receiving order was made on November 26 last, the liabilities expected to rank being returned in the statement of affairs at £78,774, and the trustees stated that a dividend of from 6d. to 1s. in the pound might possibly be declared from the assets. The bankrupt began business in 1841, in Lowndes-street, with between £100 and £200 capital, and he subsequently engaged in large building operations, chiefly in South Kensington. He ascribed his failure to inability to realise his house property, and to the continuous depreciation of the value of it, and to heavy payments for interest on mortgages. The Official Receiver reported that although the bankrupt had kept such books as were usual and proper in his business, they did not sufficiently disclose his business transactions and financial position; and that he had continued his trade after knowing himself to be insolvent. The trustees opposed on the further ground that he had contributed to his failure by unjustifiable extravagance in living. Mr. Registrar Brougham said that with reference to the charge of imperfect book-keeping, the bankrupt had not kept such books as sufficiently disclosed his business transactions and financial position. He thought, however, that while the charge of unjustifiable extravagance in living was not established, the bankrupt had continued to trade after knowing himself to be insolvent. He suspended the order of discharge for 18 months.

A BUILDER COMMITTED FOR FORGERY.—At Southwark Police-court, on Tuesday, Arthur Goddard, 46, builder, 9, Swerdale-buildings, Sydenham, was charged on remand with forging and uttering various leases of houses in Sydenham and elsewhere, whereby he defrauded William Mercer and others, to whom he had mortgaged the same. It was stated that the indictment would include forgeries, involving payments of about £12,000 to the prisoner on the forged securities. The prisoner pleaded "Guilty," and Mr. Slade committed him for trial at the Old Bailey.

### CHIPS.

The plans of the new church to be erected at St. Anne's-on-the-Sea, prepared by Messrs. Pugin and Pugin, of Westminster, have been accepted, and the work of building will be commenced shortly. The new edifice will cost between £8,000 and £10,000.

A presbytery is shortly to be erected in the Rhondda Valley, Glamorganshire, from plans prepared by Mr. Charles C. Jones, architect, 44, Charles-street, Cardiff.

At the annual meeting of the Scottish Right of Way and Recreation Society held on Friday, under the presidency of the Lord Provost of Edinburgh, resolutions were adopted in favour of Mr. Bryce's Rights of Way (Scotland) Bill, and congratulating the directors on the issue of the Glen Doll right of way case.

The Metropolitan Board of Works will consider to-day (Friday) the following recommendation from the Works Committee of the whole Board:—"That, having regard to the evidence given by Mr. Fleuret and Mr. R. C. Driver before the Royal Commission appointed to inquire into certain matters affecting this Board, neither of them be again employed professionally on behalf of the Board."

It was decided on Monday that the Jubilee memorial at Liverpool shall take the form of a tower, with clock and chimies, to be added to University College, from designs by Mr. Alfred Waterhouse, B.A., P.R.I.B.A., who estimated the cost at £5,020, exclusive of clock and chimies.

The foundation-stone of an Episcopalian parsonage about to be built at Lochbuie, in the Island of Mull, was laid on the 21st June. The style is Early Scottish, harmonising with the adjoining church. Mr. David MacIntosh, of Oban, is the architect; and Mr. McColl and Graham, of Oban, are the contractors.

A new mission room at Abergwynfi, near Maesteg, is now in course of erection, and accommodates 181 adults. The architects are Messrs. Halliday and Anderson, of Cardiff and Llandaff.

The Building Committee of the Blackburn Technical School decided, on Monday, to commence the smaller scheme at once, which means building a part of the new Technical School only at a cost of £16,000, and the architects, Messrs. Smith, Woodhouse, and Willoughby, are instructed accordingly. The subscriptions to the scheme have not come in as fast as was expected, amounting at present to about £13,000. We illustrated the selected design on the 18th May last.



## STATUES, MEMORIALS, &amp;c.

ABERDEEN.—The Marquis of Lorne unveiled last week the colossal statue of William Wallace, erected under the terms of the Steill bequest at Aberdeen. Designs for the statue were invited by the trustees from sculptors in the United Kingdom, and also in France, Germany, and Italy, by open competition in 1884, to which twenty-five artists, both British and foreign, responded. Three designs were selected, which the artists were invited to revise. The design ultimately chosen was that of the late William Grant Stevenson, A.R.S.A., Edinburgh. It is the largest bronze statue in Scotland, and weighs about six tons, the granite in the pedestal weighing over 200 tons. The pedestal is over 17ft. high, and the statue 16ft. The figure is supported mainly on the right foot, the left being advanced and raised on a projecting rock. The right hand grasps a two-handed sword, while the left is outstretched, the whole action being intended as expressive of the spirit of Wallace's reply to the friars sent to him by the English king before the Battle of Stirling Bridge, "Go back and tell your masters that we came not here to treat, but to fight and to set Scotland free." The base, which was erected by the firm of Messrs. Adam Mitchell and Co., builders, under the superintendence of Councillor Morgan, their senior partner, is supported on a concrete foundation, 3ft. thick and 18ft. square. A middle base course 18ft. square is composed of Corennie granite, and consists of two steps and a plinth with splay. Above this is a dressed portion 6ft. high, surmounted by a pedestal of rustic stonework. On the base course bronze panels are placed bearing inscriptions culled from events in the life of the hero. The statue—which was cast in bronze at the foundry of Messrs. H. Young and Co., Ecclestone Ironworks, Pimlico—has with its base cost Mr. Steill's trustees £3,250, apart from other indirect expenses involved. Their art advisers in Edinburgh were, as stated, Sir J. Noel Paton and Dr. Rowland Anderson; and in Aberdeen, Mr. A. Marshall Mackenzie, of Messrs. Matthews and Mackenzie, architects.

## CHIPS.

The stained-glass window which has been placed in the south transept of the parish church of Ashford, Kent, in remembrance of the forty years' incumbency of Canon Alcock, is now complete. The four lights into which the window is divided are filled in respectively with figures of St. Mary the Virgin, St. John the Evangelist, St. John the Baptist, and St. Elizabeth. The artists are Messrs. Powell, of Whitefriars.

The ceremony of laying the foundation stone of the new Hospital for Infectious Diseases for the King's Norton rural sanitary authority was performed on the 28th ult. The hospital, which is being erected at a cost of about £5,200, exclusive of the value of the land, is situated at West Heath, midway between King's Norton and Northfield, and will provide accommodation for twenty adult patients.

The Blacksmiths' Company will shortly hold an exhibition of work exemplifying the trade of a blacksmith. Prizes will be offered, and competition is invited amongst journeymen and apprentices.

At Glasgow Dean of Guild Court on Friday, authority was given to erect a church, halls, and other offices, at the corner of Meadowpark-street and Finlay Drive, Dennistoun, in connection with the Evangelical Union body.

A carved oak altar table, with two super-altars and tabernacle complete, together with some other sanctuary fittings, were dedicated at St. Mary's Steps Church, Exeter, on Sunday week. They have been carried out by Mr. Harry Hems, of Exeter, from designs by the new rector, the Rev. E. Square.

The parish church of St. Michael-le-Belfry, York, is about to be restored from plans and in accordance with a report by Messrs. Domaine and Brierley, of that city.

Memorial stones of a new Liberal Club now in course of erection at Fallsworth, near Ashton-under-Lyne, were laid on Saturday. Mr. David Jones is the architect.

Mr. Charles C. Jones, M.S.A., of 44, Charles-street, Cardiff, has been appointed estate surveyor to the Pentwyn Estate, Whitchurch, the property of Mr. Hugh Jenner, Hereford.

The death is announced of Signor Luigi Mussini, Director of the Gallery of Paintings at Siena, and himself a distinguished artist. One of his works, a picture describing an historical game of chess between the Cardinal Ruy Lopez and a Calabrian surnamed Il Putto, is now on view at the Italian Exhibition, Earl's Court.

The Darwen town council have appointed Dr. Armitage medical officer of health for the borough.

## Our Office Table.

A BILL has been introduced by Mr. Whitmore to give to the Home Secretary, pending the election of the London County Council, and subsequently to that council, powers to restrict the excessive height of buildings in existing streets in London. Under the Metropolitan Management Act the Metropolitan Board of Works has such powers in the case of new streets; but in the case of existing streets neither the Board nor any Government department has any power to restrict the height of buildings. The proposal is, that no building, except a church or chapel, shall be erected in a street, thoroughfare, or place of less width than 60ft., which shall exceed 60ft. in height; and as to streets, &c., of greater width, any building, except a church or a chapel, must not exceed in height the width of the street, &c. If it be desired to infringe these regulations the consent of the county council, when established, and until that time of the Home Secretary, must first be obtained. By transgressing the rules thus laid down a person is to make himself liable to a penalty of £5, and a further penalty of 40s. for each day during which the offence continues.

THE preliminary arrangements for the meeting of the British Association at Bath this year have just been published. The meeting will be under the presidency of Sir Frederick Bramwell, and will be opened on Wednesday, September 5. The local committee, in consideration of the probable insufficiency of the existing accommodation for the purposes of the reception-room, are erecting a temporary building adjoining the assembly rooms. The Presidential Address and the evening lectures will be given in the drill-hall. The local secretaries anticipate that the holding of the International Geological Congress in London this year, with the unique geological features in the neighbourhood of Bath, will promote the success of the meeting. All the chief objects in Bath will be easily accessible. The old Roman bath and its adjuncts, lately uncovered, with other remains, will be of prominent interest; the new building erected by the Corporation to meet the increasing demand for the Bath waters, and the Literary and Scientific Institution, with its reading-room, library, and museum, will be open. The secretaries remark that Bristol and Clifton in one direction, Gloucester and Cheltenham in another, Salisbury, Stonehenge, and Southampton in a third—all present strong attractions, and the cathedral of Wells may be reached by a short journey along the Cheddar Valley.

THE death is announced, at the age of eighty-two years, of M. Alfred Armand, the well-known architect and numismatist, at his residence, 7, Boulevards des Capuchins, Paris. M. Armand designed the stations on many of the French railway systems, including those on the Calais, Lyons, and St. Germaine lines, notably the St. Lazare terminus, familiar to all visitors to Paris by the Dieppe and Harve routes. This station is now being reconstructed on modern lines from the plans of M. J. Lisch. The late M. Armand also designed the Hotel du Louvre and the Grand Hotel. Since 1855 he has been an honorary corresponding member of the Institute of British Architects.

MR. WILLIAM JAMES BISHOP, who for nearly half a century was connected with the Liverpool School of Art, died on Monday at the ripe age of 83 years. He went to Liverpool 53 years ago, and was attached to the Liverpool Academy of Art, first as a student, then as a member, subsequently as an associate, and eventually as President, a post to which he was elected in 1848. Seven years prior to this he was appointed to the head-mastership of the School of Art connected with Liverpool College. This position he resigned in 1884, having thus completed his 43rd year of service as chief of that institution. On his resignation a testimonial amounting to £1,150, contributed by old pupils, and other friends and admirers, was raised. This sum was invested in the purchase of an annuity, and Mr. Bishop had since lived in retirement in Queen's-road, Liverpool.

AN art museum erected by Mr. Pyke Thompson, in his grounds at Penarth, near Cardiff, to house his collections, was opened on Tuesday

week. The building is Classic in style, has been built from designs by Mr. Edwin Seward, R.C.A., of Cardiff, and will be known as the Turner House. Besides a single drawing by that artist, and a selection from his prints, it contains about forty examples of English water-colours, including David Cox, De Wint, Cotman, Copley Fielding, and Miss Clara Montalba, numerous etchings, ranging from works by Rembrandt and Hollar to those of Whistler and Haden, and also examples of porcelain and china. The gallery will be open on Sundays as well as throughout the week.

THE Liverpool city magistrates received on Thursday in last week the report presented by a special committee appointed some time since to inspect the city theatres with reference to the provision for the safety of the public in case of fire or panic. It was found in every recorded instance of fires in theatres that they originated on or behind the stage, and in no instance had the fire broken out in the auditorium. If, therefore, a solid wall of sufficient thickness was built, entirely separating the two portions, the few necessary openings being fitted with iron doors, the only difficulty to be dealt with was the stage opening or proscenium. The committee had had before them various designs and plans of fireproof curtains, and had inspected some, particularly that of the Prince of Wales's Theatre in London, which seemed to the committee to comprise everything which could be desired for the public safety. There were various modes of carrying out the principle of the fireproof curtain; but the committee had insisted that such a curtain should be provided in each of the Liverpool theatres, and also that certain improvements should be made in some of the exits and staircases. The report of the committee was adopted, and subsequently the justices renewed the licenses of the Alexandra, Court, Rotunda, Adelphi, and Grand Theatres, and of Hengler's Circus, the respective lessees giving an undertaking to complete such alterations as were not already finished.

ARRANGEMENTS have now been made for holding the tenth annual Ecclesiastical Art Exhibition in connection with the forthcoming Church Congress at Manchester. The loans will embrace goldsmiths' and silversmiths' work, ancient and modern, ecclesiastical metal work in general, embroidery, needlework, tapestry, wood and ivory carving, ecclesiastical furniture, paintings, drawings, architectural designs for churches and schools, photographs, books, and MSS.

WHAT are the "arms" of the city of Bath? Complaints were raised at Tuesday's sitting of the city council of Bath that the surveyor of works, in repairing the Guildhall, had entirely changed the coat of arms thereon emblazoned, it is alleged, without authority. Alderman Clarke remarked that he was not sure what the surveyor of works would not do under the head of "repairation." Here was a building which had been erected over 100 years; the arms of the city had been cut upon it, and on maps of the city of 200 years ago there was the same arms exhibited. Now the arms had been remodelled, and were quite different to what they were before. Mr. Quin said whenever the specification was brought up for the renovation and restoration of the Guildhall, on each occasion he said, "Let it be understood that no alterations shall be made in any feature of the building." That point met with the general approval of the council. Alderman Chaffin said a meeting of the Corporate Property Committee has been convened especially to consider the question, and would report hereafter whether the coat just cut was the real arms of the city or spurious.

A SCHEME of reorganisation has been adopted by the Liverpool City Council in the Nuisance Department, consequent on the retirement of the Chief Inspector Fitzpatrick on a superannuation allowance. A medical man (Dr. E. W. Hope), at present assistant to the medical officer of health, will be appointed chief inspector of nuisances, with entire control of the whole department, and the salary will be raised to £50 a year; while the new superintendent, Inspector Cooper, will be paid £150 a year only. By the rearrangement, it is believed that the administration and general efficiency of the department will be improved, while a monetary saving of £210 a year will be made.



**MEETINGS FOR THE ENSUING WEEK.**

**SATURDAY (TO-MORROW).**—Edinburgh Architectural Association. Annual Excursion to Elie, St. Monance, Balcaskie House, and Kellie Castle. Meet in Booking Hall, Waverley Station, 9.15 a.m.

**THURSDAY.**—Municipal Surveyors' Association. Annual meeting at Institution of Civil Engineers. General meeting 12 noon. Papers by H. U. McKie, G. R. Strachan, and Lieut.-Col. Jones, V.C. 2.30.

**FRIDAY.**—Municipal Surveyors' Association. Annual meeting at Institution of Civil Engineers. 11.30 a.m.

**SATURDAY.**—Trip by steamboat from Temple Pier 11 a.m. to inspect the Tower Bridge and new Outfall Works at Barking.

**Architectural Association.**—Visit to Laver Marney, July 14. Start 8.50 a.m. Postal order, 5s., to Mr. Ernest S. Gale, 5, York-buildings, Adelphi, not later than July 11.

**Trade News.****WAGES MOVEMENTS.**

**LEEDS.**—A strike amongst the Leeds joiners and carpenters fairly commenced on Monday, when the six months' notice given by the masters for alteration of rules came to an end. The men ask an advance from 7½d. to 8d. per hour for working time, time and a quarter for the first two hours of overtime, and time and a half for all time after the first two hours up to 7 a.m.; the abolition of piece-work; and six months' notice from either side for any alteration of the working rules, the said notice to expire on the 1st of July in any year. The men working under the following five firms gave one day's notice on Saturday morning to terminate their engagements:—Messrs. J. H. Thorpe, Nicholson and Son, Tomlinson and Sons, Irwin's, and Craven and Umpleby. The men at these establishments have come out almost in a body, the unionists having been joined by the non-unionists. They base their claim for an increase in their wages on the fact that the trade has improved in an appreciable degree since 1879, when wages were lowered from 8d. to 7½d. per hour, and they believe they have selected the five firms which, being the busiest, are least able to suffer a stoppage of work.

**CHIPS.**

The shareholders of the Westminster Aquarium have adjourned for a week, until Wednesday next, the consideration of a scheme for selling the buildings to a new company for £330,000, the proposal of the promoters of the new undertaking being to erect on the site, at a cost of £400,000, a very large hotel facing the Houses of Parliament, and a large block of offices, chambers, &c., eight stories high, along the whole length of Tothill-street.

The reopening of St. Mary's Church, Studley, after internal restoration, took place on Thursday, the 28th ult. The alterations and additions include an improved heating apparatus on the hot-water system of Messrs. Renton, Gibbs, and Co., Liverpool. New open seats of pitch-pine have been substituted for the old pews, this work having been carried out by Messrs. Skelton and Co., of Birmingham, and another feature is the enlargement and repair of the organ by Messrs. Hewins, of Stratford-on-Avon. Mr. J. Jones was the clerk of the works.

The death is announced from Mhow, Central India, of Major A. S. W. Connor, executive engineer, M. W., in the Public Works Department.

**DOULTING FREESTONE.**

**THE CHELYNCH STONE.**—The Stone from these Quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable Stones in England.

**THE BRAMLEDITCH STONE** is of the same crystalline nature as the Chelynoch Stone, but finer in texture and more suitable for fine moulded work.

Prices, and every information given, on application to CHARLES TRASK and SONS, Doulting, Shepton Mallet, Somerset. London Agent:—Mr. E. A. WILLIAMS, 16, Craven-street, Strand, W.C.

**HAM HILL STONE.**

Greater facilities have been provided for working these Quarries, and the Stone can be supplied in large quantities at short notice.

Prices and every information given on application to  
**THE HAM HILL STONE CO.,**  
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**Holloway's Pills.**—This medicine embraces every attribute required in a general and domestic remedy; it overturns the foundations of disease laid by defective food and impure air. In obstructions of the liver, lungs, bowels, or any other organs these Pills are especially serviceable. They never cause pain or irritate the most sensitive nerves or most tender bowels.—[ADVT.]

**HYATT'S LENS and "SEMI-PRISM"**  
LIGHTS for PAYMENTS, STALLBOARDS, ROOFS, &c.  
TILE and GLASS LIGHTS in beautiful designs.—THADDEUS HYATT, Manufacturer, 9, Farringdon-road, London, E.C.

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TEAK, VENEER, and FANCYWOOD  
MERCHANTS,  
120, BUNHILL ROW, LONDON, E.C.

The most extensive Stock of every kind of  
Wood in Planks and Boards, dry and fit for  
immediate use.

**TENDERS.**

\*.\* Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

**ADDLESTONE.**—For alterations and additions to Tudor House, Addlestone, Surrey, for Mr. D'Arcy S. Blackburn, Messrs. Maynard and Stutfield, 6, Great Queen-street, surveyors:—

Gale, A. A., Woking*	...	...	£1,397 10 0
Martin, J., Addlestone*	...	...	1,385 0 0
Knight, T., and Sons, Chertsey	...	...	1,275 0 0
Ansell, C., Lambeth...	...	...	1,122 0 0
Kirk Bros., Battersea (accepted)...	...	...	980 0 0
Brown, W., and Sons, Addlestone*	...	...	955 0 0
* Received too late. Surveyor's estimate £1,000.			

**BATH.**—For building works at the workhouse, for the City Board of Guardians:—

Long (accepted)...	...	...	£69 0 0
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**BALHAM, S.W.**—For painting, papering, and decorating at Byrne-road, Balham, S.W. Mr. E. H. Selby, 26, Craven-street, Strand, architect:—

Kirby and Chase (accepted).

**BOURNEMOUTH.**—For supplying and fixing between the sea-water pumping station and the reservoir towers two sets of electro-mechanical water level indicating apparatus (Jennings and Brewer's patent), for the Bournemouth Improvement Commissioners. Mr. G. R. Andrews, surveyor:—

Jennings, G., London (accepted).

*To Municipal Authorities, Engineers, and Surveyors.*

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Have been specially selected and adopted, after severe tests, by the South Australian Government for the drainage of Adelaide. The Sockets and Pipes are made in one piece under great pressure by Steam Machinery from the finest selected Poole Clay taken from Beds on the works, and, by hydraulic testing, have been proved superior to any other pipes in the market.

Prices and particulars can be obtained from

**GEORGE JENNINGS, STANGATE, LAMBETH, LONDON,**  
And the Manager, South-Western Pottery, Parkstone, Poole, Dorset.

**TWELVE GOLD AND SILVER MEDALS AWARDED.**

**ZINC ROOFING.**  
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**VIEILLE MONTAGNE SOLE MANUFACTURING AGENTS.**

**NO SOLDER.**

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47 & 49, ST. ENOCH SQUARE.

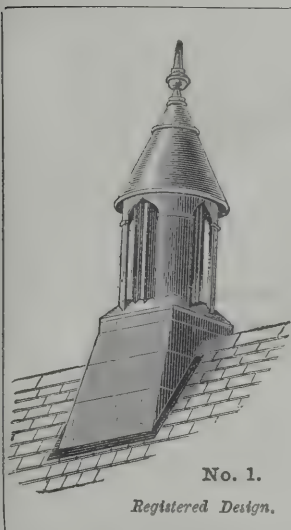


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## SELF-ACTING AIR-PUMP VENTILATOR.

Perfected October, 1887. 50 Per Cent. Reduction in Price.



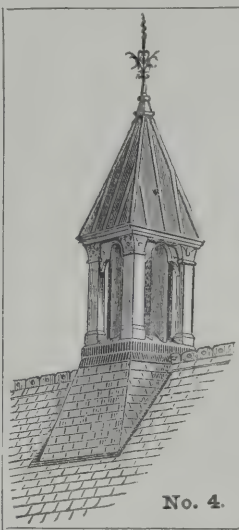
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Registered Design.

The most Powerful  
Exhaust and  
**CHEAPEST**  
**VENTILATOR**  
**IN THE MARKET.**

**IMPERVIOUS TO  
WET AND DOWN-  
DRAUGHT.**

Strongly made of the Best  
Steel, Galvanised, and  
Finest Workmanship.

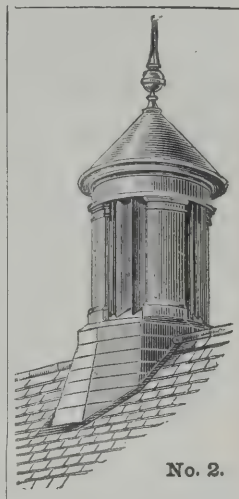


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**CAUTION**  
TO  
**ARCHITECTS.**  
**FRAUDULENT**  
**SUBSTITUTION.**

Having received complaints alleging the failure in certain cases of the Air-Pump Ventilator, upon examination being made it was found in every instance that the contractor had substituted (to secure a greater profit to himself) a cheap and inferior Ventilator resembling, in outward appearance, the Air-Pump Ventilator which had been specified to be used.

It is respectfully requested that, in specifying the Ventilator, the words "ROBERT BOYLE & SON'S LATEST IMPROVED PATENT SELF-ACTING AIR-PUMP VENTILATOR" be used.



No. 2.

### ROBERT BOYLE & SON'S

Latest Improved Patent (1882)

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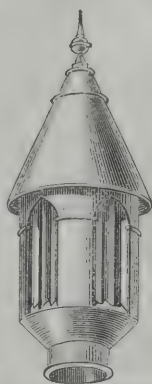
The Cheapest and most  
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FROM **12s.** EACH.

Approved of and used by Baldwin Latham, C.E., Bailey-Denton, C.E., W. Eassie, C.E., and by all the leading Architects, Sanitary Engineers, Builders, and Plumbers in the United Kingdom.



SOIL-PIPE VENTILATOR



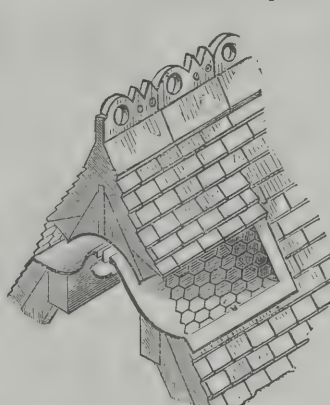
DRAIN OR SEWER VENTILATOR.

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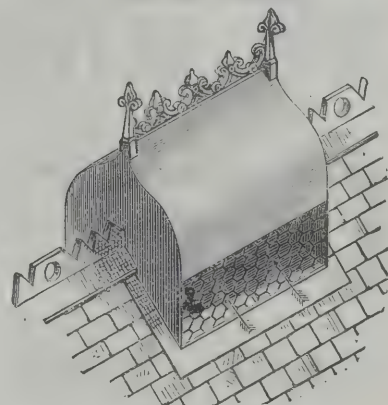
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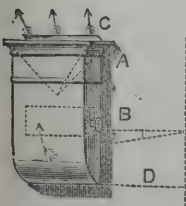


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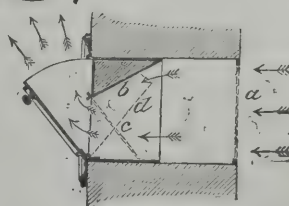
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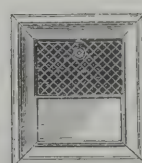
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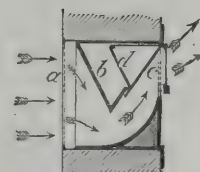
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SECTION. No. 2C.

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**BRIDLINGTON QUAY.**—For detached villa, West-side, Victoria-road, for Mr. J. V. Kinsley. Mr. J. Earnshaw, M.S.A., Carlton House, Wellington-road, Bridlington Quay, architect:—

Clark ... ..	£630 0 0
Rennard ... ..	579 18 10
Bailey ... ..	473 0 0
Hudson ... ..	465 0 0
Gray ... ..	454 0 5
Owston (accepted) ... ..	434 0 0

All of Bridlington Quay.

**BRIDLINGTON QUAY.**—For pair of villas on the Victoria-road Estate, for Mr. J. T. Schofield's Exors. Mr. J. Earnshaw, M.S.A., architect:—

Owston ... ..	£1,025 0 0
Bailey ... ..	1,000 0 0
Hudson ... ..	995 0 0
Rennard ... ..	925 0 0
Mainprize, Bridlington Quay* ... ..	840 0 0

\* Accepted.

**BURGH-LE-MARSH, LINCOLNSHIRE.**—For reseating the parish church:—

Waite, Croft (accepted).

**CAMDEN TOWN.**—For erection of proposed Mission House for St. Michael's, Camden Town. Mr. L. W. Ridge, architect:—

Drew ... ..	£1,676 0 0
Nightingale ... ..	1,583 0 0
Patkinson ... ..	1,576 0 0
Williams ... ..	1,573 0 0
Ashby Bros. ... ..	1,530 0 0
Patman and Fotheringham ... ..	1,479 0 0
Srivener ... ..	1,444 0 0

**FULHAM.**—For painting, whitewashing, &c., at the St. George's Union Infirmary in the Fulham-road, for the Guardians of the poor of St. George's Union. Mr. H. Saxon Snell, London, architect:—

Vigor and Co. ... ..	£1,380 0 0
Dorrell and Co. ... ..	980 0 0
Bamford, W. ... ..	860 0 0
Foxley, G. ... ..	779 0 0
Lilly, W. G. (accepted) ... ..	728 0 0

**HORSMONDEN.**—For rebuilding the highway bridge at Horsmonden, for the Kent county magistrates:—

Farrow, F. (accepted) ... ..	£295 0 0
------------------------------	----------

**HASLAND.**—For laying drains at the cemetery, for the Chesterfield Rural Sanitary Authority. Mr. H. Wray Weller, Assoc. M. Inst. C.E., engineer:—

Jackson ... ..	£50 0 0
Walker ... ..	33 6 5
Holmes (accepted) ... ..	33 0 0
Hicklin ... ..	37 14 8

**HUDDERSFIELD.**—For new store and butcher's shop, for the Hillhouse Industrial Society, Ltd., Huddersfield. Mr. J. Berry, 9, Queen-street, Huddersfield, architect:—

(Accepted tenders.)

Excavators, masons, and bricklayers:—	
Stead and Kaye, Viaduct-street.	
Carpenters and joiners:—	
Hampshire and Armitage, Northumberland-street.	
Slater:—	
Jowitt, W. E., John William-street.	
Plumbers and glaziers:—	
Crossley, Boulton, & Marsden, Union Bank-yard, New-street.	
Plasterers:—	
Robinson, J., and Son, Marsh.	
Painter:—	
Lunn, J., High-street.	
Rest of Huddersfield. (Total cost £2,000.)	

**INVERKEITHING, N.B.**—For doubling the present line of railway between Inverkeithing and Townhill for the purposes of the North Bridge Railway, for the North British Railway Co.:—

Cousin, Alloa (accepted).

**IPSWICH.**—For the supply of 130,000 wood blocks for street-paving purposes, for the town council. Mr. E. Buckham, borough surveyor:—

	A.	B.
Per 1,000.	Per 1,000.	
Raker, F., and Co., Ipswich ... ..	£4 2 6	£4 11 6
Coe, A., Ipswich ... ..	4 4 0	5 9 10
Gandy, W., Nottingham ... ..	4 0 0	4 10 0
Fitz-jimon, J., and Son, Dublin, (6in. by 5in. by 3½in. in beech)* ... ..	5 5 0	
A.—8in. by 4½in. by 3in. ... ..		B.—9in. by 4½in. by 3in.

\* Too late.

**LEAMINGTON.**—For the erection of a spire to St. John's Church. Mr. J. Cundall, architect:—

Smith, Milverton (accepted).

**LEICESTER.**—For work required in the construction of foundations for engines and engine-house, pump wells, screening chamber, and sinking of a well for water supply, with other works in connection therewith. Mr. J. Gordon, borough surveyor:—

Duesbury, G., Leicester ... ..	£6,090 0 0
Jexbury, J. O., Leicester ... ..	5,695 5 7
Longden, G., and Son, Sheffield ... ..	5,432 17 0
Biggs, J., Birmingham ... ..	5,431 11 11
Tempest, E., Leicester ... ..	5,300 0 0
Dickson, J., Leicester ... ..	5,100 0 0
Holme and King Liverpool ... ..	4,999 12 11
Ward, B. W., Whe'atstone ... ..	4,774 19 6
Bentley, S. & E., Leicester (accepted) ... ..	4,404 16 9
Evans, J., Birmingham (withdrawn) ... ..	3,822 18 3

**LAMBETH.**—For alterations and repairs to premises at rear of Nos. 37 to 41, Lower Marsh, Lambeth, and in Robert-street adjoining, for the Exors. of the late Mr. R. Grove. Messrs. Ford and Heskest, architects. Messrs. Karslake and Mortimer, surveyors:—

Seutt ... ..	£1,100 0 0
Nightingale ... ..	881 0 0
Lawrence ... ..	841 0 0
Marsland ... ..	832 10 0
Lathey ... ..	795 4 0
Mills ... ..	789 0 0

**LONDON.**—For construction of a block of shops and offices in Great Tower-street, adjoining the Joint Stock Bank. Mr. D. Joseph, 17 and 18, Basinghall-street, architect:—

Perry and Co., Bow (accepted) ... £9,567 0 0

**LONDON.**—For erection of a warehouse in Fashion-street, Spitalfields, for Mr. E. Harris. Mr. E. W. Hoblen architect:—

Scotney, O. ... ..	£1,168 0 0
Allard, A. G. ... ..	1,160 0 0
Brown, Son, and Co., Battersea* ... ..	1,150 0 0

\* Accepted.

**LONDON.**—For rebuilding of the Fountain p.h., New-street, Broad-street, Golden-square, for Messrs. J. Huggins and Co. Mr. W. West, architect and surveyor:—

Brass ... ..	£2,706 0 0
Nightingale ... ..	2,683 0 0
Patrick ... ..	2,610 0 0
Hall, Beddall, and Co. ... ..	2,542 0 0
Peto ... ..	2,419 0 0

**LONDON.**—For Cripples' Home, Marylebone-road. Messrs. Habershon and Fawcner, architect:—

Laurence and Co. ... ..	£8,690 0 0
Holland and Hannen ... ..	8,615 0 0
Gregar ... ..	8,396 0 0
Patman and Fotheringham ... ..	8,383 0 0
Bentley ... ..	8,256 0 0
Maides and Harper ... ..	8,097 0 0
Jones and Co. ... ..	7,892 0 0
Gregory and Co. ... ..	7,777 0 0

**MORTLAKE.**—For the erection of lecture hall, billiard room, lavatories, and offices, and sundry alterations to the Mortlake and Barnes Liberal Club. Mr. T. C. Barralet, Bridge Chambers, Richmond, architect. Quantities supplied:—

Carman, Richmond ... ..	£1,316 0 0
Higgs, London ... ..	1,283 0 0
Bishop and Tribe, Putney ... ..	1,270 0 0
Heard, Barnes ... ..	1,240 0 0
Hickinbotham, Teddington ... ..	1,230 0 0
Judd, Kingston (accepted) ... ..	1,17 0 0

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Manufacturers of STONEWARE DRAINPIPES with HASSALL'S, STANFORD'S, and ROBBINS' PATENT JOINTS. Also Manufacturers of all sizes of Fire Bricks, Lumps, Tiles, Boiler Seating Blocks and Flue Covers; Fire Brick Backs, and Linings for every description of Fire Grate or Stove; and fine-ground Fire-Clay Cement, which can be supplied either in bulk or in bags.

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extremely simple; but as drainage plans are usually to a very small scale, very accurate dimensions must be taken. The pipes are measured by the foot-run. Describe the kind of pipe, if jointed in puddled clay, or Portland cement, or Stanford's patent joints. The average depth of digging is included with the description. If the dimension is an odd number of feet, it must be written as even, as a length of pipe is 2ft. Count the number of bends, junctions, diminishing pieces, and siphon traps. Some surveyors state the sizes of junctions and diminishing, thus:—"4in. to 6in."; but others would write "6in. junction," and the price is always taken as the larger size. The inspection chamber is taken as any other part of the building; the dimensions are given in full.

#### THE METROPOLITAN BOARD OF WORKS INQUIRY.

THE Royal Commissioners continued their investigations into the proceedings of the Metropolitan Board of Works at the Westminster Sessions House on Friday.

Mr. John Hebb, assistant architect to the Metropolitan Board of Works, was recalled. Before his examination was continued he said: I should like to call your lordship's attention to the fact that I am not represented by counsel. In the remarks which your lordship was pleased to make with regard to the Brixton-road frontage, that the Board ought not to have intrusted this matter to a temporary official, it was suggested that I was incompetent for the work. I should like to tell your lordship that I have been educated as an architect. I was articled to an eminent man for five years. I travelled abroad for some time to complete my education. On my return I joined my master, first as assistant and afterwards as his partner. I was his partner for about ten years, carrying out some important works, assisting him in all his buildings, and practising at the same time on my own account. I came to the Board of Works with excellent testimonials. I have performed very important duties. I have the control of all work in connection with the operation of the Building Act and the Metropolitan Management Act so far as relates to buildings. I have acted as superintending architect, by Mr. Vulliamy's appointment, with the consent of the Board. I am a man, I submit, in every way of equal professional status to Mr. Vulliamy, and am perfectly competent to perform the work in question. Your lordship made remarks about me which, I think, are calculated to cast a slur on my professional character. I have never had any slur or imputation cast upon me until the last few months. I have always been looked upon as an honourable man; I am an honourable man, and there is no transaction of my life that I am ashamed of or that will not bear the light of day.—Lord Herschell: I think that possibly it would be better not to make that observation after the correspondence which has been brought before us relative to these applications for orders for theatres. I hope you now see that that was an improper proceeding.—Witness: Your lordship may form your own opinion. I do not consider that that was any imputation on my honour or honesty. I was led into that correspondence by Mr. Harris. There is nothing in that correspondence of which I am ashamed. It is utterly false to say that I levied blackmail on Mr. Harris or any other man. Mr. Bosanquet: Had you any appointment from the Board to inspect theatres?—Witness: I had. I have not got the appointment here; but the form of it is that I am authorised to inspect theatres at any time of the day or night. Your powers are to inspect the theatres with regard to keeping open doors at any time during the performance, or any other convenient time?—Yes. Did you make any memorandum of the times you went to inspect under those powers?—No. Witness admitted that on one occasion he wrote Mr. Harris as follows: "Will you let me have a box? You know I am authorised at any time to go into the theatre." Witness admitted that in another letter he asked for passes, adding that he did not like to go to the theatre alone. Lord Herschell: Do you suppose that you had the power to go into the theatre and take the best seat during the whole of the performance?—Witness: No, I do not. I never forced myself into the theatre. I deferred to

the convenience of the lessee. Lord Herschell: Your power was to see how the theatre was constructed?—Witness: It was part of my duty to see how the audience left the theatre. Lord Herschell: That would be just before the audience were leaving?—It would, my lord. You could have stood by the door and seen that?—Yes. Further questioned, witness admitted that on another occasion he was refused admission to Her Majesty's Theatre, and he reported the fact to the Board. Lord Herschell: Did you ever ask for box or stall tickets at that theatre?—No, my lord. Will you swear that?—Yes. Lord Herschell here observed that it was the duty of Mr. Hebb to supervise the theatres; but he certainly had no right to have asked for favours as he had done. Lord Herschell (to witness): Having regard to what has been elicited in the course of this inquiry, do you not think that by asking for these passes in this indiscriminate manner your conduct was improper?—Witness: I admit that it was indiscreet, but it was not improper. I was not guilty of any impropriety, although my conduct may have been indiscreet. I had no motive in asking for these passes, nor had I any intention of threatening or doing anything which was not honest and straightforward, and that is all. I say no more. Mr. Winch: Supposing any structural alterations were required, who would have the supervising of them?—I should have. Would plans be submitted to the Board?—Plans are sometimes submitted. Have you ever received any commission from any architect in respect of plans submitted to the Board?—Never. Nothing of any kind?—Never.

The witness was next examined on the question of the line of frontage in Brixton-rise. He said that he only knew of one person who had expressed dissatisfaction. That gentleman had suggested corruption, and had written a letter to the *Times*. Lord Herschell remarked that it could hardly be said that only one man had expressed dissatisfaction on the subject, inasmuch as a considerable deputation waited on the Board in reference to it. Witness submitted that he was not concerned with the appearance of Brixton-hill, but simply had to find a matter of fact. The decision which he arrived at was an honest one, and was the result of considerable reflection. Lord Herschell: The important question is whether it was an honest one?—I say that I had no communication with anybody. I decided it entirely on the merits of the case without any reference to anybody interested in the matter. Lord Herschell: You seem to be displeased about some observations which I made, and which you think reflected on your competency. I say nothing about that, but simply that your decision in this case is an unintelligible one.—The witness said that Mr. Vulliamy consulted him on nearly all questions of frontage, and he followed the conditions of the office. He had decided other lines of frontage. In this case there was some vestry squabble of which he was perfectly ignorant, and which caused all the trouble. By Lord Herschell: Witness's duties were confined to the Building Act Department. He had been in no way directly or indirectly concerned in the sale or purchase of lands. In answer to Mr. Meadows White, witness said he had been articled to the late Mr. Edward P'Anson. The witness was examined at length by Mr. Meadows White relative to the structural alterations of theatres. He denied that he told Mr. Emden, upon his inquiry as to the objections in regard to Terry's Theatre, that he must go and read the Board's by-laws. He suggested to Mr. Emden what the difficulties were. The theatre was treated in precisely the same manner as all others. If there was any delay in the passing of plans it was simply through the action of Mr. Emden, who tried to force two sets of plans on the Board which they declined to accept. With regard to the Avenue Theatre, Mr. Sefton Parry came to witness in great trepidation and tried to bribe him. Lord Herschell: What did he offer you?—Witness: He asked me whether I could act as his architect, which I declined. The matter was referred to the Building Act Committee. Witness admitted that he had made some trifling mistakes in what he alleged was objectionable in connection with this theatre; but these did not affect the principle that the construction in the place then referred to was defective. Lord Herschell: Have you in any case acted for or advised any

person professionally outside the Board?—Witness: No. You have done no professional work except that which you have done for the Board?—None. I did act once in a friendly way for the construction of a panorama in Leicester-square. This came to me through a French architect, who asked me to act for him. I applied to the Board, and they refused to allow me to act. I immediately turned over the work to another architect, and I received no payment whatever.

Mr. James Willing, advertising agent, pointed out that the name of "Mr. Willing" appeared in the official report of the proceedings three times in connection with the giving of money to Mr. Matthew Goddard. He was not the Willing referred to. The name of the person who made the payment was Willing, not Willing.

Mr. Earle Bird, owner of the Albany-road Estate, Camberwell, was then called. He explained that the plans for laying out that estate were made by Mr. Evans, who told him that the estate was for sale. There was a difficulty in getting the plans passed. He thought it might be by reason of Mr. Evans's inexperience as an architect, that gentleman having hitherto been a builder, and he then engaged Mr. Fowler and Mr. Saunders. Mr. Fowler had long been his architect, but he had never employed Mr. Saunders before. Witness asked Mr. Fowler to overhaul the whole of the plans and ascertain why they had been rejected. The development of the estate had been delayed six months, involving a loss of quite £2,000. Mr. Fowler suggested another outlet on the plan, and drew another tracing. Did Mr. Saunders make a plan?—No. What did he do?—To make the thing thoroughly safe I thought we had better employ Mr. Saunders and let him also examine the plans, which he did. He made an alteration, giving more space to the parish by widening a footpath. A considerable time still elapsed before the plans were passed. I paid Mr. Fowler £50 and Mr. Saunders 50 guineas. Mr. Winch: Did you know Mr. Saunders was a member of the Board?—Yes. You knew that he would have to consider the plans?—I thought so. Mr. Saunders drew one line on the plan, and charged you 50 guineas for it? He did not charge me. I gave it to him, and was glad to get out of it for that.

Mr. F. Hards, auctioneer and valuer, Greenwich, gave evidence in reference to the transactions in which he was jointly interested with the witness Bradley, a clerk in the Architects' department of the Board, who was called at the previous sitting of the Commission. For the cottages in Europa-place, Battersea, they gave about £460. They were sold to the Board of Works for £700. A builder had been sent to repair the property. It was not the practise for an agent to put his name in the conveyance when he was dealing in a speculative property. Witness admitted that with reference to one site, for which £15,000 was offered, he sent a letter to the Board stating that his client was dissatisfied with the amount. Pressed by Lord Herschell, he admitted that he had no client for the site. He was himself the client, and he pretended that he had a client. Further questioned, witness said he gave Bradley £500 out of one transaction, he having served him in a similar generous way on a previous occasion. Witness surveyed the property as though it had not belonged to him, and charged his fee to the Board for so doing.

Mr. Frederick Gordon stated that he tendered for plots in Northumberland-avenue on which the Grand Hotel now stands. The land was afterwards assigned to a company. Mr. Saunders was employed as architect, along with the Messrs. F. and H. Francis. Was not one architect enough?—It was a very large undertaking, and I thought I should like to have two heads. Had you made any communication with Mr. Saunders before you made tender?—I have no doubt that the matter was talked over with him and Messrs. Francis. Witness said that he and two co-partners purchased the site of the Hotel Métropole, and assigned the interest in the contract to the hotel company. Messrs. Francis and Mr. Saunders were the architects. He had many interviews with Mr. Saunders with reference to the site. Mr. Saunders had no interest in the matter beyond that of architect.

At Tuesday's sitting of the Royal Commission Mr. Frederick Gordon, re-examined, stated that



after he had offered 26 years' purchase for the freehold of the Grand Hotel site, he was astonished to find two years afterwards that a ground-rent lower down the Northumberland-avenue was sold to the Colonial Institute for 25 years' purchase. By Mr. Winch, Q.C.: He made £12,000 over the re-sale of the Hôtel Métropole. He had built four hotels—the Grand, the Métropole, the Holborn Restaurant, and the First Avenue. Mr. Saunders was the joint architect in respect of the Hôtel Métropole, and sole architect for the Forest Hotel at Chingford. The latter was Corporation property. Neither the Holborn Restaurant nor the First Avenue Hotel had anything to do with the Corporation or the Metropolitan Board of Works. Mr. Saunders was employed on the Grand Hotel at witness's own desire. Mr. Winch: You knew he was a member of the Metropolitan Board?—Yes. Did you know he would have a voice in passing the plans?—I cannot say that I considered that. I knew that he would understand the routine of the Board with reference to buildings and frontages, and so on, undoubtedly. Did you know that he would have a voice in passing and approving the plans?—I should have thought that unlikely. You thought he would abstain?—Certainly I should as a public man. Does it not strike you as strange that you did not employ him as architect in respect of sites in which the Board of Works or the Corporation had nothing to do?—I employed him in connection with the Royal Forest Hotel at Chingford. That was a Corporation site?—Yes. What would be the amount of his fees in regard to the Grand Hotel?—I paid to Messrs. Francis and Saunders £7,128 17s. 6d. Mr. Saunders would have half of that amount?—I presume so. What did Mr. Saunders do in connection with those plans?—I really cannot say. I understand that Mr. Saunders did advise you as to the price you were to offer for the ground-rent for the Grand Hotel and the Hôtel Métropole?—I believe he stated what had been offered before. He told you what price to tender?—He might have mentioned that he thought less than a given sum would not be taken. That would be a sufficient hint for anyone tendering?—I instructed Messrs. Francis to tender under the amount that he mentioned. I tendered £8,000, and £9,000 was ultimately accepted. Answering further questions, the witness said there was considerable delay in passing the Grand Hotel plans. Objections were made by the Royal Institute of British Architects. There was not this delay in connection with the Hôtel Métropole. Mr. Saunders received 150 guineas for advising as to the site prior to the building of the Hôtel Métropole. Mr. Saunders's name appeared with that of Messrs. Francis on the Grand Hotel plans. Why did his name not appear on the Métropole plans?—I am not aware that his name did not appear. I should have expected it to appear. Although the transactions have been very large, I have never been asked for anything by any employés of the Board, nor have I ever made any payment to any.

Mr. Frederick John Francis said that he was joint architect with Mr. Saunders in the Grand Hotel and the Hôtel Métropole. They were both employed as architects about the same time. Witness prepared the plans of the Grand Hotel. Lord Herschell: Did Mr. Saunders take any part in the preparation of the plans of the Grand Hotel?—Witness: Oh, yes; he did. He consulted me on some things in connection with the plans. As to the Hôtel Métropole, you were appointed architects about the same time?—Yes; I think Mr. Saunders was the first spoken to. Mr. Gordon asked both us and Mr. Saunders to prepare an elevation. Ours was preferred, and it was carried out. Was any plan prepared by Mr. Saunders beyond that elevation which was not adopted?—He assisted us in the preparation of the plans. Had you any arrangement with Mr. Saunders to divide the commission in the case of the Grand Hotel?—I think we did. You seem to have done the lion's share of the work?—I think our firm did. Mr. Winch: Did you get, in respect of the Grand Hotel, any material assistance from Mr. Saunders?—Witness: It is rather an invidious question. I do not think he did anything but what we could have done ourselves just as well. With regard to the Grand Hotel, what did he do?—I do not think he did very much. He assisted us. He drew a

line or two?—I think that is putting it a little too strong. The agreement was that if you applied for the land and got it, Mr. Saunders was to be joint architect?—Yes. Was it the same for the Hôtel Métropole?—Yes. Has Mr. Saunders been joint architect with you in anything else?—Nothing else. There was delay with regard to the Grand Hotel plans in consequence of the Institute of Architects?—Yes. Was there any delay on the part of the Board of Works?—We considered them dilatory. Some of the delay was owing to the action of the Institute of Architects?—Certainly. Mr. Meadows White: Can you give me instances where there was dilatoriness on the part of the Board?—One very conspicuous instance was that of Trafalgar-buildings, opposite the Grand Hotel, where the National Liberal Club was for five years. There was vexatious delay on the part of the Board. By Mr. Winch: No member of the Board was employed as joint architect in respect of Trafalgar-buildings.

Mr. George Brick, a builder, was examined by the President with reference to the action of a Mr. Brown, a member of the Metropolitan Board, as to a dangerous house in Lisson-street, which had been condemned. The house was let at a high rental to a "sweater." A dangerous and defective party wall was allowed to remain for more than a year, although it had been condemned, and people were allowed to live in the building of which it formed a portion. Witness, in pursuance of notice, shored up his wall, and did so to the satisfaction of Mr. Peebles, the district surveyor. Mr. Meadows White, Q.C., asked the witness why he did not pursue the ordinary course under the Metropolitan Act of pulling the wall down?—Witness: Because Mr. Brown came to me and said, "I am a member of the Board, and I will bring a big man to smash you if you do so." In answer to other questions, witness said Mr. Brown subsequently brought Mr. Thomas, of the Dangerous Structures Department, to inspect the building. The work had not been done yet. Mr. Meadows White, Q.C.: Do you mean to suggest that the district surveyor was bribed?—I mean to say that the work has not been done yet.

Mr. George James Thomas, superintendent of the Dangerous Structures Department of the Metropolitan Board of Works, stated that Mr. Brown, about the end of April, asked him to go and view the place and advise him. He asked the permission of Mr. Vulliamy to go, as this was no part of his duty. This was granted him, and he went, and found a large fissure in the wall, but there was no immediate danger, as it was shored up. He did not see Mr. Brick there. The only person he saw on that occasion was Mr. Brown. He was afterwards instructed by the Board of Works to see whether the fissure in the wall had been remedied, and he discovered, on examination, that it had. Witness reported the result of his visit to Mr. Vulliamy, and told him that, in his opinion, there was no immediate danger, and Mr. Vulliamy said that the matter might as well stand over for a month or two. Mr. Studd: Did Mr. Brown give you anything?—No. Has your salary been raised since then?—It was raised two years ago. Did Mr. Brown move that it should be raised?—I don't know that he did.

Mr. George Brown, a member of the Metropolitan Board of Works, was next examined with reference to his property in Lisson-grove, Marylebone, and denied *seriatim* the statements made by Mr. Brick.

Sir Joseph W. Bazalgette stated that from 1856 to 1870 there were three assistant engineers. In 1870 one retired, and Mr. E. Bazalgette was appointed. At the present time there were three assistant engineers, and their duties were to attend generally to the drainage and special works in the districts. The bridges formed an important feature, and the prevention of floods over 40 miles of the river frontage. They had also to see to the execution of contracts in connection with these works. It was part of the duty of witness to advise as to whether the contractor did his work well; but the inquiries into the position of a contractor were instituted by the solicitors. Since the Board had been in existence the works carried out by the Engineering Department had cost £8,000,000, and he produced a list of the contractors, showing how the money had been spent. There was a regular form for the tenders. A large number of works had been

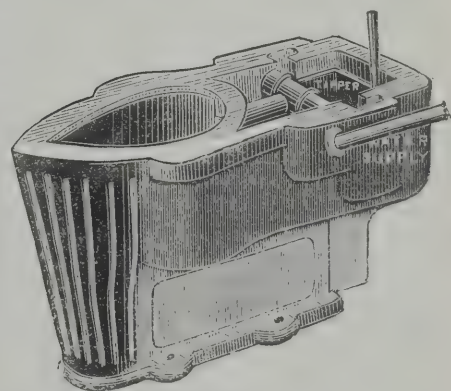
carried out by Mr. W. Webster, his tenders being generally the lowest. Lord Herschell questioned the witness with respect to the Battersea Bridge improvement. Mr. Grant, who died this year, would have had to do with Mr. Webster's contract at Crossness. As to who the district surveyor would be he (witness) would ascertain. Sir Joseph was then asked by the President to get out particulars about the cartage contracts, and also further information about the Crossness Pumping Station. The Commission adjourned till to-day (Friday).

The following letter with reference to Mr. Hebb's evidence on Saturday appeared in Monday's *Standard*:—

"Mr. Hebb says that the dissatisfaction with the Brixton-rise award is got up by 'one man,' *i.e.*, myself. The award was condemned by the Lambeth Vestry (one hundred and twenty members), except so far as one member was benefited by it, and he could avert the opposition of his friends. It was practically condemned by the Metropolitan Board, because, by a clause in their Omnibus Bill of this session, they proposed to give an appeal against any decision of the superintending architect, and named the Brixton-rise case as the reason for the clause. Mr. Broadhurst had publicly threatened in the House of Commons that he would obstruct all the Board's business unless they altered the law which gives so much power to one man without appeal. Mr. Broadhurst was one of the deputation which went to the Board on this subject; he insisted upon my being the spokesman of the deputation, in the absence of a neighbour who was too ill to leave home; but the deputation was surprised that Mr. Broadhurst was not allowed to speak after me. Mr. J. F. Reid, Mr. Dann, Mr. J. W. C. Washington, Mr. W. Morris, Mr. Jennings (agent for the Hayter Estate), and others were active in their hostility to the award. When Mr. Hebb says he was not concerned with the appearance of Brixton-rise, he ignores the highest function of the office he temporarily filled—*viz.*, to adjust public and private interests in frontage lines.—WILLIAM STORE, 3, Lambert-road, Brixton-rise, July 7."

#### WRIGHT, SUTCLIFFE, AND SON'S PATENT WASTE WATER CLOSET.

THIS closet, of which we give a sketch, is suitable for farm-buildings, barracks, factories, board schools, artisans' dwellings,



railway stations, or workshops. It can be worked in groups, and one or more at a time can be kept at work. The automatic flush, combined with flush handle, for flushing after the closet has been used, is a certainty. It is impossible for the waste water closet to stop up. The closet is fitted with a wood seat complete in itself, and requires no other woodwork. It is impossible for it to freeze up, and the water forms a disinfectant, always flushing, and can be flushed by hand after being used. Automatically all day long the water is collected in the tipper and upset with great force, and will wash out half a stone of wet waste at one flush. It may be fixed outside in the yard, where there is sufficient fall to allow the closet to be fully out of the ground; but it is much better to go down a step or two, or it may be fixed in the cellars under the pavement, or in the yards of dwellings. The closet is perfectly safe when bedded down with cement, and as



firm as it is possible to make any closet. It does not require any woodwork, being complete in itself. All that is required is for the plumber to connect the waste pipe from the house sink to the closet, where, on account of the strong rush of water, the makers recommend the fixing of a 1½ in. "Sutcliffe patent trap" and brass grate funnel top.

#### WAYSIDE NOTES.

"HANKEY'S FOLLY" is about to be extended, and from the so-called monstrosity at Albert-gate the public gaze has been turned to the mammoth pile near St. James's Park Station, which may be taken as a supreme example of the truth of Mr. Garbett's assertion that pure selfishness is at the root of all that is hideous in architectural design. An examination of this mass of bricks and mortar discloses nothing more noble on the part of its builders than a determination to produce a nest of tenements that shall be leased so as to yield the utmost possible percentage on the capital expended. No one, it is true, can prevent persons building in a "Skinflint" style of architecture; but it should be possible to arrest the upward progress of works when they have passed the height of reason, and threaten the light and air of surrounding buildings, and destroy the outlook for miles around. Whether Mr. Whitmore's Bill is the right measure in the right place, it is difficult to say off-hand; but it appears to be a step in the proper direction, and, if passed, should protect us for a time from the selfish encroachments of building promoters, who care not for the commonweal so long as their speculations are a financial success.

Considerable amusement seems to be distilled during the examination of witnesses before the Royal Commission to inquire into the irregularities that have taken place among the "Spring-gardeners," as a contemporary facetiously styles the incorruptible members and officials of the Metropolitan Board of Works. I glance down the latest reports served up to improve, or otherwise, the architect's digestion at the breakfast-table. "Laughter" I find liberally inserted amongst the evidence, and "great laughter" on occasions such as when Lord Herschell naively inquires of a witness as to how much energy his co-worker expended on draughtsmanship in connection with the design of the "Grand," for, and in consideration of, a moiety of £6,000 odd. The witness being uncertain to a line or two, his lordship suggested *three* lines as the sum total of work done, the which humorous suggestion appears to have fairly "brought down the house."

This is no laughing matter. For the public, after hearing about the easy method of earning £450, to learn that the price of three lines or so is £3,000 odd, will make matters worse as touching the pupil-mania referred to last week as the probable result of such facts becoming known. Seriously, however, these disclosures are indirectly undermining the credit of the profession, and I would remind the reader of my suggestions as to the line of reasoning the public will take, especially as all convicted of having acted "improperly" in this matter excuse themselves by saying they do not see what they have done wrong. One of the most curious features about the inquiry is to note how strangely warped are the views of some of those who have been in the witness-box as to what is right and what is wrong. One could pardon many of the "indiscretions" of those concerned if a clean breast were made of things, and the error of their ways confessed. But an endeavour to brazen out the accusations, and to equivocate, savours of childishness, and does not enlist one's sympathies.

Of course, if I exclaim, "What a dearth of competitions!" you must needs advertise three in a lump on the very same day. Well, all the better if they are of a promising nature. The Friars' School at Bangor appears to be a competition quite *sui generis*, as the well-tempered architect remarked of his new office-boy, when the latter upset the inkpot over an elaborate perspective. The scheme proposed seems excellent, and unless there be any stipulations compelling the

expenditure of a lot of time on the drawings, a £20 note will amply reimburse the competitor, if he be an architect of that barndoor description to which I have at times alluded. I opine that the names of architects "of some experience in scholastic buildings" will appear to the Governors of the school to be legion. There are very many, doubtless, who will suddenly come to the conclusion that they have had some experience in school-building, and submit their names to the Governors of the Friars' School, in the hope of winning a "place."

As regards the other architectural competition that you advertised last week—the alterations and additions to a hydropathic establishment—the chief thing requiring consideration will most likely prove to be a system of baths, which, of course, are the main features in such institutions, and to which all others are, in idea, subordinated. The scheme may include the provision of Turkish baths, in which case the readers of the "B.N." should be in a position to tackle the problem. Other bathing provisions are simple by comparison, as many of the hydropathic appliances are of a movable nature. Regular visitors to hydropathic establishments, however, will here have the pull over others, as, simple as the arrangements may seem, it is necessary to know the whole theory and practice of hydropathy before one can design a building in which the treatment may be administered effectively. The worst point about latter-day hydropathic establishments is that they rapidly degenerate into hotels, pure and simple. Few ever maintain a standard like that of the late Mr. Smedley, whose extensive building on the Derbyshire heights will be familiar to many.

I have read your pleasant sketch of the proposed line of route to be followed by the A. A. excursionists in the autumn. It will have the advantage of combining interesting architecture with beautiful scenery. Some few of the places to be visited I know, but could join the excursion with great zest were there not a few other things to be attended to, and ever so many prospected jaunts on the Continent, including a scheme for visiting all the chief cities of Europe in a fortnight! About this time of the year one's fancy commences to lightly turn to thoughts of travelling with a pleasure of anticipation that I firmly believe no one but enthusiastic architects can appreciate.

It seems that, after all, there is some benefit to be derived from stuffing an old church full of incongruous monuments in the worst of taste, and hard and cold enough in design to send a cold shiver all over one. The writer of an article on St. Helen's Church, Bishopsgate, in a daily, makes a plea for the fund for the restoration of the old building—not, mark, for the sake of the architecture *per se*, but because it is so rich in monuments. So long as the money comes in, however, one must not find fault with the plea upon which it was obtained. According to the writer of the article in question, St. Helen's Church is richer in monuments than any in the Metropolis, excepting, of course, Westminster Abbey and St. Paul's. Among them is one to a certain Martin Bond, an officer of the "trained bands" got together at Tilbury in preparation for the great event that didn't come off in A.D. 1588. There is also one to a gentleman of the name of Julius Caesar, or, rather, to a *knight* of that name, a master of the Rolls in the reign of James I. But of the adjuncts of old St. Helen's the chief worth preserving are the brasses of the 15th and 16th centuries. P.S.—In case anyone should wish to subscribe, I might mention that the amount required for the restoration is between £5,000 and £6,000.

The Church House movement is still alive. A meeting of the general committee was held last Saturday, under the presidency of the Archbishop of Canterbury, who said that they hoped that "the good ship, the Church House, would be launched in a fortnight." The site chosen appears to be on the south side of Dean's Yard, comprising all the houses in the terrace except Nos. 6, 7, and 8 (the acquisition of which is still under consideration), with all the land behind, bounded by Tufton-street,

Little Smith-street, and Great Smith-street, the right of purchase of which, for the sum of £26,500, has been secured. This is all interesting; but what I want to especially point out is the remarkable portion of the Bishop of London's speech on this occasion, who is reported to have said that "*they would be bound by no architect's plans*," and, moreover, that "beginning in a small way, they would see exactly what they wanted, and be able to provide accordingly." What is the English of this? Are the clergy also on bad terms with us, or is it the effect of the M.B.W. scandals? Or do they fear an elevation like the Architectural Museum, hard by? Are the builders going to have the job, or what is the meaning of this mysterious dictum? One thing is certain, and that is that the Bishop of London is in error in thinking that anyone can get a more convenient building by not being bound by an architect's plan. When a person is going to build he *thinks* he knows exactly what he wants; but, as we are all well aware, he never can express his desires, and, strange though it seems, the first duty of an architect is to tell his client the nature of the plan that will best suit his requirements. GOTH.

#### TIN ROOFS.

THE tin roof is much in esteem in America, especially in Philadelphia, where it is used in many of the buildings. Of course, there is good and bad tin. The poor tin does not last longer than zinc; but the best tin is said to have lasted 100 years. Many of the old buildings of Philadelphia which have been removed have shown tin roofs that were laid in 1830 quite as good as new. We cannot, however, take all we hear about other metals. It is said that zinc, copper, iron, &c., have all been tried and proved worthless after a few years' exposure, but tin has been found the most lasting of all. Copper is known to be one of the most durable of metals for roof covering, and the old sheets of it laid on the roofs of many of the old churches in this country and France attest the durable nature of copper and its slow oxidation. The protective coating of verdigris entirely preserves the surface from further injury. The durability of tin roofing depends on the perfectness of the tin coating, which, when once injured, allows galvanic action to be set up between the tin and iron.

#### ROYAL ACADEMY ADMISSIONS.

JULY, 1888.

STUDENTS' UPPER SCHOOL.—F. D. Bedford, T. Davison, W. M. Duke, C. S. Haywood, W. F. Horton, H. P. Lancaster, F. C. Ryde, C. S. Spooner, F. J. Verity.

STUDENTS.—T. O. Agutter, C. J. Blomfield, L. C. Cornford, A. Mackintosh, E. A. Rickards, W. J. W. Roome, W. Sheen, J. C. Watt, E. J. A. Wigram.

PROBATIONERS.—F. W. Bedford, D. J. Blow, W. A. Fenn, J. W. Little, J. G. Oakley, J. Paxton, A. M. Poynter, J. Rawlinson, F. E. Smea, E. W. M. Wonnacott, P. S. Worthington.

The new public hall at Caistor has just been opened. The building has been substantially erected by Mr. Jalland Chapman, of Grimsby, from plans by Mr. John Johnson, F.R.I.B.A., London. Fronting High-street, and partly visible from the west side of the Market-place, the hall covers half the area of the old bowling-green. The interior arrangement provides stage, ante-rooms, offices, &c., and a main hall that will seat 500. Mr. H. Webster has gratuitously given service by acting as clerk of works. The cost has been £1,200.

During the restoration of Caistor Church, near Peterborough, in 1862, the south porch, which had fallen into a ruined condition, was wholly removed, the doorway blocked with masonry inside, and the old oaken door, with its adornment of richly-designed ironwork (an illustration of which was given in the *Instrumenta Ecclesiastica*) left to a more speedy decay by exposure. This doorway has now been reopened, and a restoration and replacement of the old ironwork upon a new oak door has been accomplished by Mr. James Button, a local builder.

A new Roman Catholic Church is about to be erected in Wheatland-lane, Seacombe. The estimated cost is £5,000, exclusive of the porches, which are to be subsequently added. It will be of Gothic design, built by Mr. John Shaw, of Priory-street, from a design by Mr. Edmund Kirby, architect, Liverpool. The nave walls, of local red sandstone, will be arched with clerestory windows above, with lead glazing. It will accommodate about 800 worshippers.



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## ILLUSTRATIONS

ELY AND LICHFIELD CATHEDRALS.—BUSINESS PREMISES, FOREGATE-STREET, CHESTER.—A CORNER MIDDLE-CLASS HOUSE AT HAMPSTEAD, ILLUSTRATING PAPER ON "PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES,"—OLD OAK OVERMANTEL.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## TWO ENGLISH CATHEDRALS.

THE photographs from which we give these views to-day were exhibited among other masterpieces of the art as applied to architecture, at the Photographic Exhibition recently held at the Crystal Palace, and they form part of a series of similar subjects by Messrs. Poulton and Son, of Taunton-road, Lee, including views of Salisbury, Carlisle, Worcester, and other English cathedrals.

*Ely.*—Of this grand church we have on previous occasions given several drawings, as will be seen by the references given below,\* and of course the leading facts concerning its history are familiar enough to the student. It may be well, however, here to recount some few details for the convenience of the reader. The present illustration shows the great western tower, looking at the church from the south side, with the return wall of the fine Early English entrance "galilee," which was built about 1215, projecting westwards. The two staircase turrets to the front of the picture emphasise the south-west transept, now used as the cathedral baptistery, and the apsidal chapel seen on the east side of this transept is that of St. Catherine, like to which a similar chapel once existed on the north side of the church, when the north-west transept was standing. St. Catherine's chapel was rebuilt in 1845. The West tower was erected between 1174 and 1197, the lower portion being in the Late Norman style; but the work merges into the Transitional Pointed form of building as it reaches the battlements. The crowning feature, which takes an octagonal form on plan, was added about 1380 to 1400, and is consequently in the Decorated style. The height to the top of the turrets is 215ft. Sir Gilbert Scott, who restored the cathedral, gave it as his opinion that this western tower when first finished was covered by a form of timber and leaded spire, which subsequently became frequent in the neighbouring marshlands—a vast, octagonal pyramid, surrounded by four of smaller size, rising from their turrets at its angles. St. Margaret's at Lynn once furnished a similar instance, and such must have terminated the beautiful detached tower at West Walton (see BUILDING NEWS, June 20, 1884), while a spire of like design still remains at St. Mary's, Sutton. All these followed the great Ely type built by Bishop Ridel, or in the next century by Bishop

Northwold. The *tout ensemble* of the grouping of the high-roofed western transepts, with the leaded spires also on their four terminal turrets, must have been most imposing and majestic in character when seen combined with the high roofs of the western porch and the vast spire above on the great western tower. Bishop Eustace, at his own cost, built the galilee, and it is to be specially noted as a remarkably grand example of the Early English style, contemporary with St. Hugh's work at Lincoln or Bishop de Lacy's eastern chapels at Winchester. Again, at St. Alban's, before Lord Grimthorpe's destruction there, John de Cella's western portals were similar specimens of fully-developed detail of corresponding date. The Ely porch is, of course, later in its mouldings than that at Lincoln, and may have been a little more recent than the St. Alban's portals, though the capitals were identical and furnished the most exquisite Early English works which we possessed. Now, thanks to Lord Grimthorpe, Ely is unique. The historical summary of the cathedral may thus be abbreviated:—In 673 the monastery for men and women, married and single, was founded by St. Etheldreda, the queen, who was its first abbess. She was succeeded by her sister Sexburga, whose daughter Ermenilda followed. In 870 the Danes destroyed the monastery, and in 970 the secular clergy, who had returned to Ely, dismissed by Ethelwold, Bishop of Winchester, and reconstructed the monastery for monks only, under the rule of St. Benedict, Brithnoth being the first abbot. In 1071 the abbey was surrendered to William the Conqueror by Abbot Thurstan, and in 1083 the building of the present cathedral was commenced by Abbot Simeon, brother of Walkelin of Winchester. The diocese was erected in 1109, and Hervé le Breton was the first bishop. The nave, transepts, tower, and choir were continued through the 12th century, and the galilee was built early in the 13th. Bishop Northwold erected the presbytery eastward of the choir in 1235, and the Lady-chapel was commenced in 1321. The following year the central tower fell, and then Alan of Walsingham constructed the octagon and lantern over the crossing. Bishop Hotham soon after reconstructed the western portion of the choir. In 1330 Prior Crauden's Chapel and Guest Chamber, now the Deanery, were built, and in 1340 the stalls in the octagon by Alan of Walsingham were done. In 1400 (Ely Porta) the great abbey gate was built by Prior William de Walpol and the octagon, or campanile, of the western tower followed. The cloisters were put up in 1440, and Bishop West's chapel in 1534. In 1541 the abbey was dissolved by Henry VIII., and the last Prior, Robert Stewart, was made the first dean. The octagon and choir were repaired in 1754, and Sir Christopher Wren rebuilt the north-eastern transept in 1699. In 1823 the nave, octagon, lantern, and transepts were coloured at a great cost, and in 1831 a new organ was put into the old case. The modern restoration of the cathedral was commenced in 1845 by Sir Gilbert Scott, and in 1851, '58, '67, and '70 these works were continued. In 1873 the celebration of the Bisex-centenary or twelve hundredth anniversary of the monastery took place.

*Lichfield.*—The days of the Civil War were sad times for this cathedral, which became simply the stronghold of a fortress,

"... When the frantic Brooke  
The fair cathedral spoiled and took;  
Though, thanks to Heaven and good St. Chad,  
A guerdon meet the spoiler had."

Fanatical preachers speedily took possession of the pulpit, and encouraged the soldiers in their work of destruction under Lord Brooke, the fierce zealot who endeavoured to carry out his threat to destroy the cathedral; but happily he was shot by Dumb Dyott, who fired from the spire of the church. Every tomb was ransacked and every monument shattered. The spire was so mutilated that it fell, too, carrying much of the nave and transept roofs with it in 1643. It occupied eight years to restore the fabric, and the church was reconsecrated in 1669. In 1860, Sir Gilbert Scott took the church in hand and completed it. We illustrate the grand west front to-day, viewed from the close, and showing the three spires. For grace of outline and harmony of general design, few churches can compare with this façade, to which Professor Willis assigns the date of 1275. It is throughout Early Decorated in style, and

consists of a centre, in which the great west window is surmounted by a gable, and of flanking towers, with octagonal stair turrets at the north-west and south-west angles. The towers have large pinnacles, from between which rise the spires. The whole front is divided into three main stages. In the lowest are three doorways, the arch of the central one rising to the top of the stage. A rich arcade covers the walls, containing statues, all lately restored or re-erected. The second stage is sub-divided into three rows of arcades, the lowest of which stretches across the front, and retains the original figures, in spite of the Puritan pikes and musketry. The west window divides the two upper arcades and rises into the third stage between the towers, the cross on the crowning gable being level with the parapets below the spires. There are windows in this stage to the towers, and the rest of the walls is covered with rich canopied arcading. The great west window of geometrical form was put in by Sir Gilbert Scott in 1863, the original window having been spoiled by the Round head soldiers. The new glass, by Clayton and Bell, is a memorial to Canon Hutchinson. The broken statues were "restored" in Roman cement in 1820-22. Although nearly all the mouldings and details of the west front were "restored" with composition at the same time as the statues already referred to, the general outline and design of the arcades and canopies have been renovated correctly, and the old work deserves careful attention, of course, for its beauty, although little of the front, unfortunately, has escaped either mutilation or restoration. The two side portals are deeply recessed in three orders, with enriched arch mouldings. The central portal takes the form of a recessed porch; the inner arch is foliated with a rich mass of leafage. The four figures on the sides of the portal are Mary Magdalene, Mary (the mother of James), St. Peter, and St. John. The doors are covered with very rich and elaborate ancient-wrought ironwork, re-fixed under the direction of Sir Gilbert Scott on new woodwork. The central spire was built by Wren for Bishop Hacket after the Reformation. Those flanking the west front are contemporary with the façade (1275).

The following illustrations of Lichfield Cathedral have appeared in our pages:—Plan of precincts (by Rev. E. C. Mackenzie Walcott), Nov. 21, 1879; elevation, west front, Jan. 16, 1886; view from east (sketched by G. H. M. Addison), March 17, 1882; the mortuary chapels, March 9, 1866; and some mouldings at, Aug. 25, 1871.

## BUSINESS PREMISES, FOREGATE-STREET, CHESTER.

THIS drawing illustrates the building which will complete towards the street the improvements being made on the site known as "Cross Gun Court," belonging to the Duke of Westminster. The archway will give access to the block of cottage flats now being erected in the rear, in the place of the old cottages formerly on the site. The flats consist of thirty tenements arranged on three stories in height, each tenement being approached by a staircase common to several tenants. The building now illustrated will contain shops with dwelling-houses, and will be built of brick and terracotta, with tiled-roofs. Messrs. Douglas and Fordham, of Chester, are the architects.

CORNER MIDDLE-CLASS HOUSE AT HAMPSTEAD.  
For description see page 36.

## FARLEIGH COURT LODGE—CHIMNEY-PIECE AND OVERMANTEL.

THIS interesting piece of old work is to be seen in the Maidstone Museum, in what is known as the Farleigh Court Lodge (upper room) leading out of the long gallery. The date of the overmantel is probably about 1600, but it is doubtful if it was to be found in the original building. The drawing was exhibited at the exhibition of works in wood, recently held at the Carpenters' Hall, and we are indebted to Mr. Edwin H. Dance for the loan of it.

The Wesleyans of Salisbury have decided to re-seat and make alterations to their chapel at a cost of £1,000 to £1,200, and have appointed Mr. Fred. Bath, F.R.I.B.A., of Crown Chambers, Salisbury, as their architect.

\* Plans: May 16, 1884, and Jan. 16, 1886; west front, Nov. 16, 1887; west tower from south, with college chapel (by J. Donkin), Dec. 23, 1881; the lantern, July 10, 1863; interior of choir, looking east, Dec. 2, 1870; tympanum over south doorway (Prior's entrance), Oct. 23, 1837; bay of nave (measured by E. G. Northy), March 6, 1880; north choir aisle (J. Donkin), Dec. 22, 1882; wall arcading, Lady chapel (Pugin trav. studentship drawings by Leonard Stokes), March 19 and April 2, 1880; Prior Crauden's chapel (Pugin trav. studentship drawings by W. H. Bidlake), March 6th, 1868; and altar cross, Aug. 12, 1887.

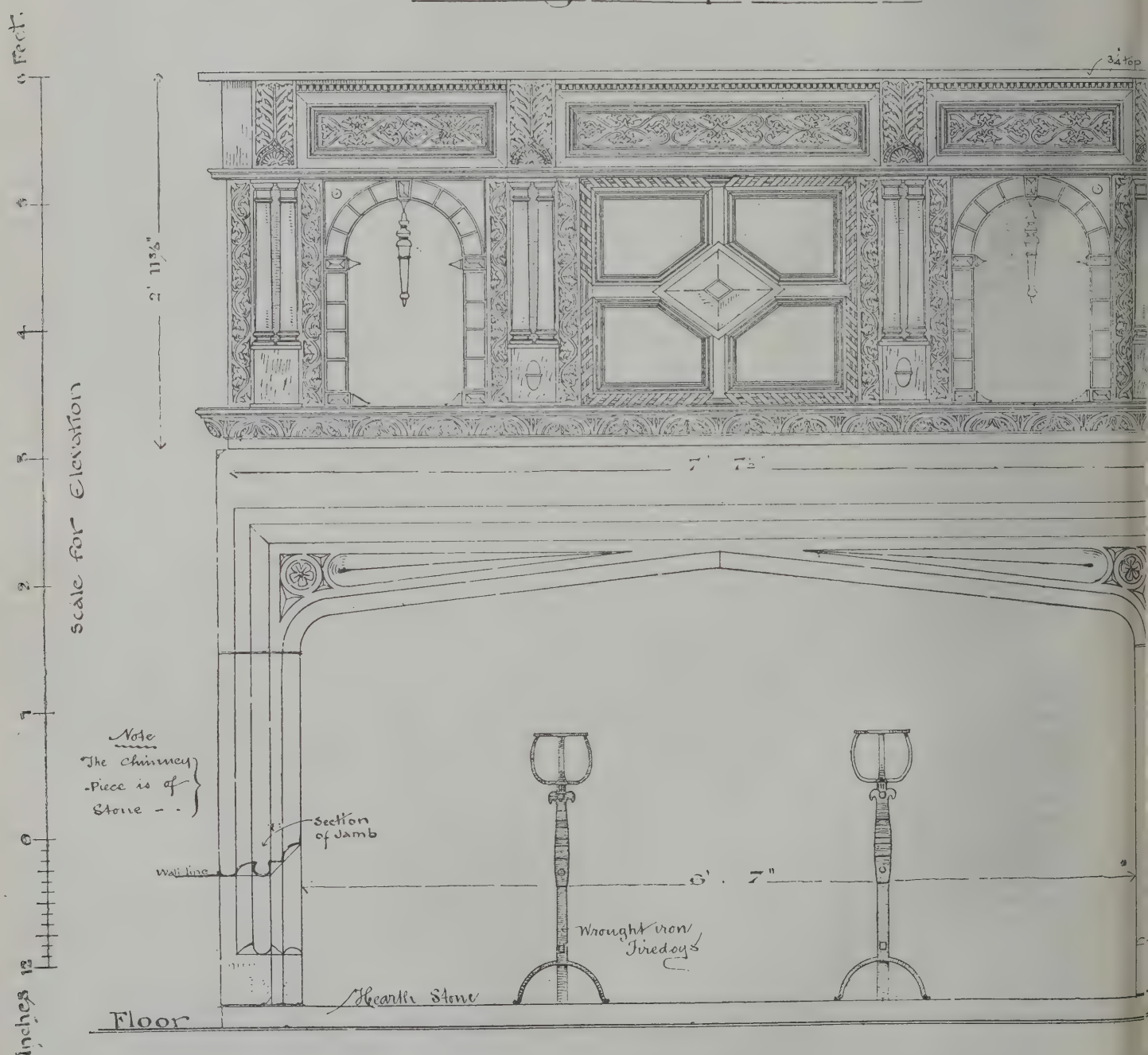


# Old Oak Overmantel, from Farle

now in Maidstone Museum.



Carving in top Panels -

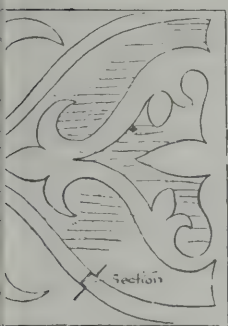


Elevation of Chimney Piece  
and Overmantel

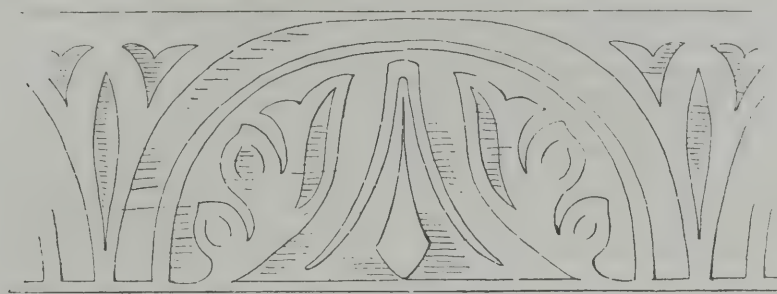
Carved  
at side



# Court Lodge.

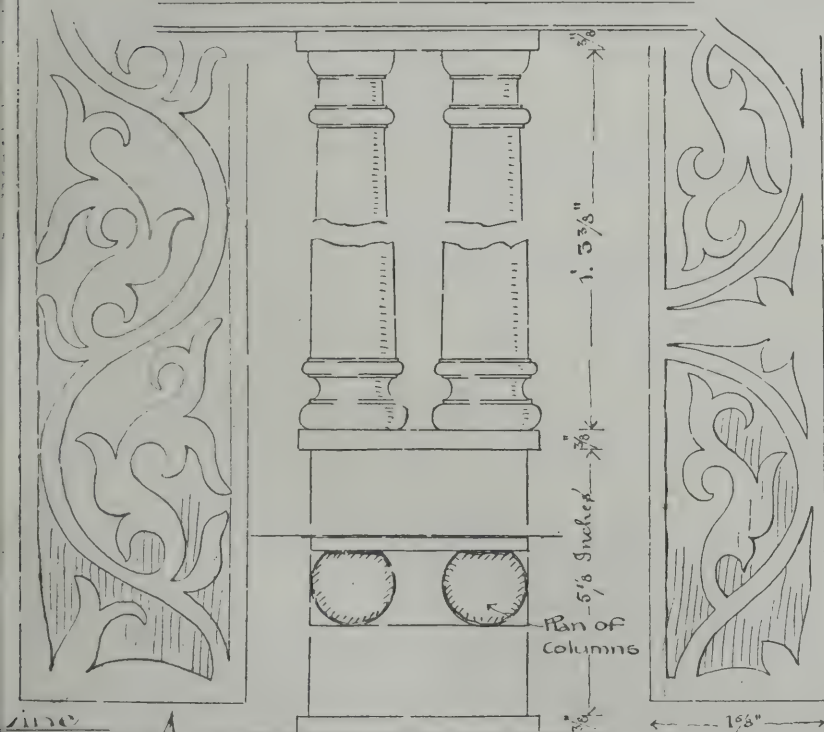
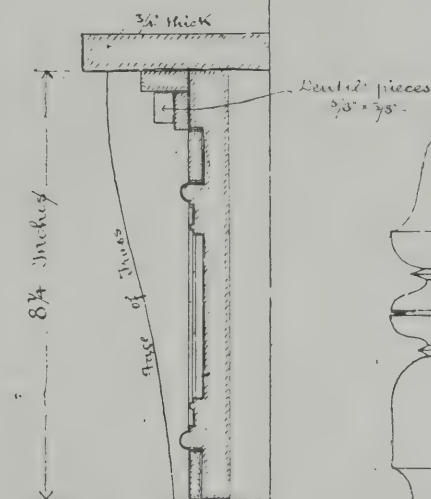
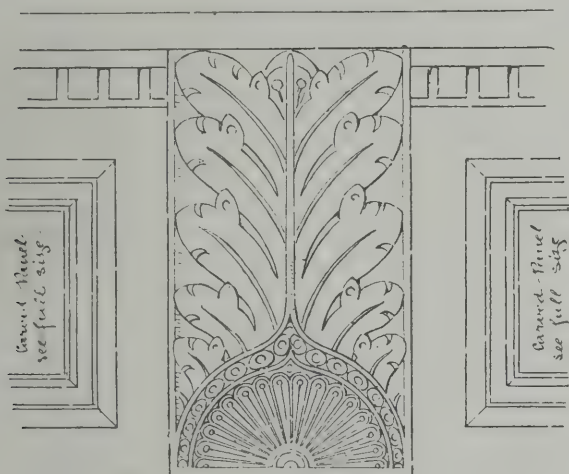


3 inches



Carving on Shelf  
circular face developed

4 5/8 inches

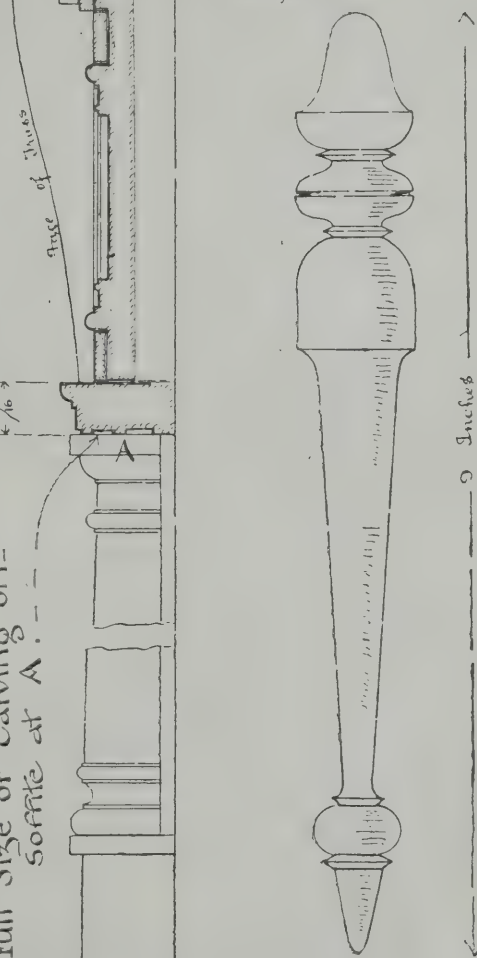


Full size applied Columns

Carved on face

Elevation

Full Size of Carving on -  
Sofa at A.



Turned Pendants  
inside Panels

Measured August 1885  
Drawn December 1887.  
by E.H.Dunce

Section



## PLUMBERS' FITTINGS AND SANITARY APPLIANCES.

**M**ESSRS. JOHN BOLDING AND SONS, of the Grosvenor Works, South Molton-street, W., have brought out a very comprehensive catalogue of plumbers', engineers', and gasfitters' brasswork and sanitary fittings, that will be found a serviceable manual in architects' and builders' offices. By the aid of a good index, anything necessary in this branch of building can be instantly referred to and the prices found. Thus, take plumbers' brasswork. We have here illustrated and priced every description of valves and washers and wastes, union-joints of every kind and size. The well-known valve closets, known as "Bolding's," possess all the latest arrangements. The "Simplex" self-trapping, overflow-valve closet is already familiar to our readers, and its construction renders the escape of sewer gas into the house impossible. One great merit of this closet is that the box is small and does not allow of the accumulation of foul matter found in larger outlet-valve closets. Another of the forms illustrated combines a slop receiver and urinal, as well as the closet; there are, besides, eight other sorts of Bolding's valve closet—one without overflow arm, and others showing various modifications suggested by experience. The "Argosy" is an arrangement with the trap above floor for situations where it is impossible to fix a trap under the floor. We especially draw the readers' attention to the earthenware closets with Bolding and Sons' siphon cistern, made in one piece of earthenware, with water waste preventing flushing cistern. Of these the "Dolphin" and "Kenon" pedestal closets are particularly effective and cleanly. The earthenware pedestal closets show P-trap, right or left hand, with flanged outlet; the enamelled iron closets are very suitable for schools and hospitals. The "Kenon" hopper closet is useful and cheap for basements. In connection with the closets we note a number of excellent after-flush and water-waste preventing cisterns. Bolding's siphon-flushing cisterns appear to have all the merits of this principle of action; some of them are noiseless. The "Siphon" after-flush waste-preventing cistern is one of the best forms. Numerous other types and apparatus are illustrated.

Wash-up sinks and housemaids' slop sinks are shown, in which Bolding and Sons have introduced various improvements; these latter sinks are made for corners of rooms, fitted up with hinged grates, hot and cold draw-off and flushing cocks, in slate, enamelled (St. Ann's), grained deal, and mahogany, varying in price from a few shillings to several pounds. Lavatories occupy several pages, and show every arrangement, from the "Paragon" cabinet stand in mahogany or walnut, priced at £16 to £20—a useful and ornamental piece of furniture to the plain lavatories for offices and barracks. For each kind a full specification and prices in the different materials are furnished. Baths, garden fittings, pumps of great variety and for various uses, patent traps and bends, gully traps, disconnecting traps of various types—amongst which we must note Bolding's "Disconnecter" for stoneware drains—and other appliances are similarly treated and classified. Gas-fittings, rain-water goods, ventilating caps and terminals are other things included in this universal guide and price-book, which will be found of everyday use to the architect.

## COUNTRY AND SUBURBAN COTTAGES AND VILLAS.\*

**M**R. JAMES W. BOGUE, architect, Edinburgh, has brought out another book on "Cottages and Villas: how to Plan and Build Them," illustrated by thirty-three plates of designs. The introductory chapters contain a few useful remarks on site and aspect, foundations, drainage, walls, roofs, arrangement, expression, and other matters. The author advocates the appointment of an architect as the most economical and judicious course—a suggestion that might seem rather conflicting with the publication of a set of designs, especially as the employment of an architect means leaving in his hands the whole design and supervision of a building; and, of course,

it is expected of an architect that he should be able to prepare for a given site and conditions a better plan and set of elevations than can be found in any published book. If the work is intended to instruct and enlighten those who are about to build their own house, the case is altered. To the latter class Mr. Bogue's handbook is addressed. Full description of the designs follow. These include designs for labourers' cottages in pairs and rows. The sculleries are rather small in one case, and it would have been preferable to have placed the pantry as a projection rather than to break into the scullery, where so much of the labour is done in this class of dwelling. Plate VI. shows a single-cottage plan arranged in a sensible manner, though we do not like the details of chimneys and porch. It would have looked more effective to have brought down the gable roof on one side over the doorway as a protection, and the cost would have been the same. The semi-detached cottages are certainly more picturesque and satisfactory than the straight row; we certainly never can see the advantage to be derived from a row of cottages intended for farm overseers, gardeners, and other tenants of this class where land is plentiful. The design for a detached villa is suggestive and capable of improvement in the elevations. We scarcely see the need, for instance, of the blank gable on the end elevation, nor the useless finials and drops to the gables—features adopted in other designs. The next plan is objectionable in the proximity of w.c. and pantry. Plates XVI., XVIII., XXVI. show square types of plans for families of varying means, the walls of rubble or brick, with dressings of stone. The arrangements combine in small compass all the usual offices. The detached villa, plates XX. and XXI., has a corner inner porch with a peculiarly-shaped entrance-hall, obtained by a partition built round the octagon-ended bay—a rather wasteful arrangement of space; a more patent objection is the position of kitchen in relation to the dining-room, and the distance between it and the dining-room door. Nor do we like an entrance-hall to communicate with a corridor, as in plate 24. Here, too, by a little rearrangement the store-closet could be turned into a useful serving room from the kitchen, which in this and other plans is placed in an undesirable position in relation to the dining-room and entrance. The plans and elevations are neatly printed, and the hints are practical.

## CHIPS.

A new highway bridge has just been commenced at Appleby; it will cost about £3,700, and is being built from designs by and under the supervision of Mr. J. Bintley, the county surveyor of Westmoreland.

Miss Margaret Thomas has executed in marble a portrait bust of the late Dr. Wilson Fox for the Shire Hall of Taunton, in which Miss Thomas's bust of Fielding already occupies a niche.

Foundation stones of a Wesleyan school chapel were laid at Eastleigh, near Southampton, on Monday. Mr. Stagg, of Eastleigh, is the contractor.

The members of the Caradoc Field Club had an excursion on Tuesday week from Church Stretton to Rushbury, where a tumulus was inspected, to the Church and Castle at Holgate, and to the Early Norman chapel at Heath.

The foundation-stone of a mission hall, to be erected in Mayfields, Westminster-road, Liverpool, and to be called Kirkdale New (Welsh) Church, was laid on Saturday. The mission hall will consist of a room 47ft. by 25ft., connected with which will be two classrooms, which can be converted into one room. The internal fittings are to be of pitch-pine. The style adopted is Gothic, the whole to be carried out in local grey brick, with red brick dressings. Messrs. J. and G. Chappell, Walton, are the contractors for the work, which will be superintended by the architect, Mr. Richard Owens, of Westminster-chambers, Liverpool.

Captain Seddon Wildeblood, of Alsager, has been appointed art master to the School of Art at Crewe, which it is proposed to convert into a school of National art, under the South Kensington rules.

Corner stones for the new chancel about to be added to Lofthouse Church, Yorkshire, at a cost of £1,130, were laid on Saturday. The addition will be Early English in style, and will be carried out from designs by Mr. W. Watson, of Wakefield. The church itself was built fifty years since.

## Building Intelligence.

**FENTON, STAFFS.**—The town of Fenton will soon have the advantage of a suite of public buildings, through the public spirit of Mr. W. M. Baker, of Hasfield Court, Gloucestershire, who will bear the whole of the cost of the new buildings and proposes to let the premises required for the public service at a reasonable rental. In conjunction with this scheme extensive improvements are being carried on, a large square and new streets being in process of formation. The square opens out of Church-street, the Public Hall forming the eastern side, and out of this square, at either end of the Public Hall, is a street in process of formation, running up to another new street, which lies parallel to Church-street, and runs from Fountain-square direct to the railway station. The buildings in course of erection comprise a central block containing magistrates' court and private room, Board and committee rooms, clerks' and surveyor's offices, and over these a public hall, 84ft. long and 42ft. wide. Wings to the right and left of main block contain committee-room, rate collector's, and other offices. The buildings are to be constructed principally of brick, with stone freely used as dressings, and surmounting the central block there will rise a fleche, rising to a height of 125ft. from the ground. The architects are Messrs. R. Scrivener and Sons, of Hanley, and the builder is Mr. William Collis, of Longton. The contract involves an expenditure of about £6,000. The ceremony of laying the foundation stone of the new hall took place on Thursday, the 5th inst.

**LEEDS.**—Pygmalion House, Boar-lane, Leeds, has just been modernised and enlarged under the superintendence of Mr. William Bakewell, architect, of Leeds. The contract was let in March to Messrs. Curtis and Son, and the stone piers, with their arches carrying the superincumbent load, together with the flank wall in Bank-street, were quickly removed and replaced with iron columns and girders, so that within the short space of three weeks the premises were opened to the public for business. The plate-glass frontage, with its polished brasswork, having the armorial bearings of England, Scotland, and Ireland on shields fixed at the three corners, and the red and white roses in the spandrels, has a total length of 90ft. towards Boar-lane and Bank-street, and 15ft. in height. On the ground floor the warehouse is approached from Boar-lane by the grand central entrance. The removal of the old stone staircase, which was a serious obstruction to the business and to the lighting of the warehouse, the re-arrangement of the fittings, and the new grand staircase 6ft. 6in. wide, with return flight to the right and left, formed of solid American walnut and pitch-pine, placed at the end of the warehouse and leading to the galleries, all combine to make the alterations a success. The total cost of the alterations will be about £2,000.

The Sleddall Victoria Jubilee Almshouses and Mission Church, Kendal, have just been formally opened. The donor, Mr. John Sleddall, left nearly £30,000 for necessitous inhabitants of the borough of Kendal, and about £15,000 has been expended in the building and endowment of the almshouses and church. There are twelve houses for aged couples, and at the end of the block stands a neat little church built in the 13th-century style, which will accommodate about 100 persons. The designs have been made by, and the work carried out under, the personal supervision of Mr. Eli Cox, architect, Kendal.

On the 28th ult. the formal ceremony took place of presenting to the city of Peterborough the recent addition made to the recreation-ground and the memorial fountain, being the local jubilee commemoration. The fountain is of polished granite, standing on the north side of the recreation-ground. It was designed by Mr. H. M. Townsend, architect, and the work has been carried out by Mr. Dickens, stonemason, and Mr. Andrew, plumber.

The trustees of the Bablake Boys' School, Coventry, have appointed Messrs. John Giles, Gough, and Trollope their architects to carry out these schools.

The plans for the new Wesleyan Chapel, Penryn, Cornwall, prepared by Mr. J. W. Trounson, Penzance, have been selected, and the work will be proceeded with forthwith.

\* Country and Suburban Cottages and Villas. By JAMES W. BOGUE, Architect, Edinburgh. Edinburgh: Robert Symon, St. James's-square.









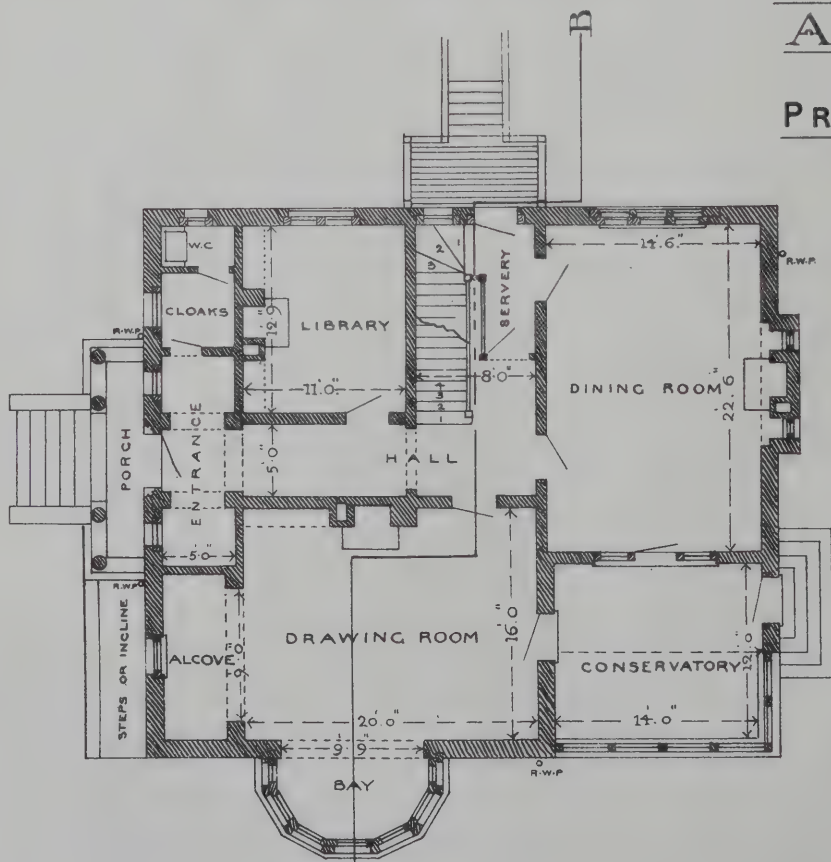
Entrance Front

Front Elevation

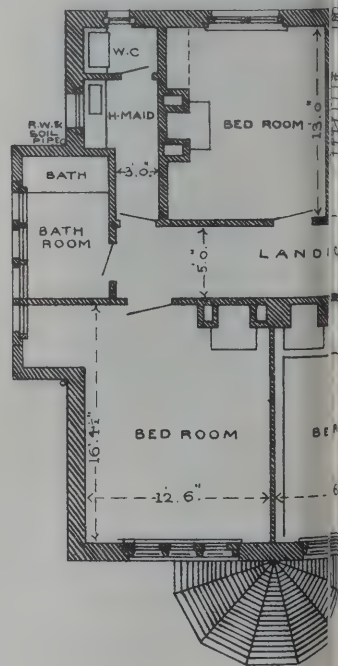
# A CORNER MIDDLE

ILLUSTRATION

## PRACTICAL ARCHITECTURE



Ground Plan



First floor



Nº 1:



ation

Side Elevation

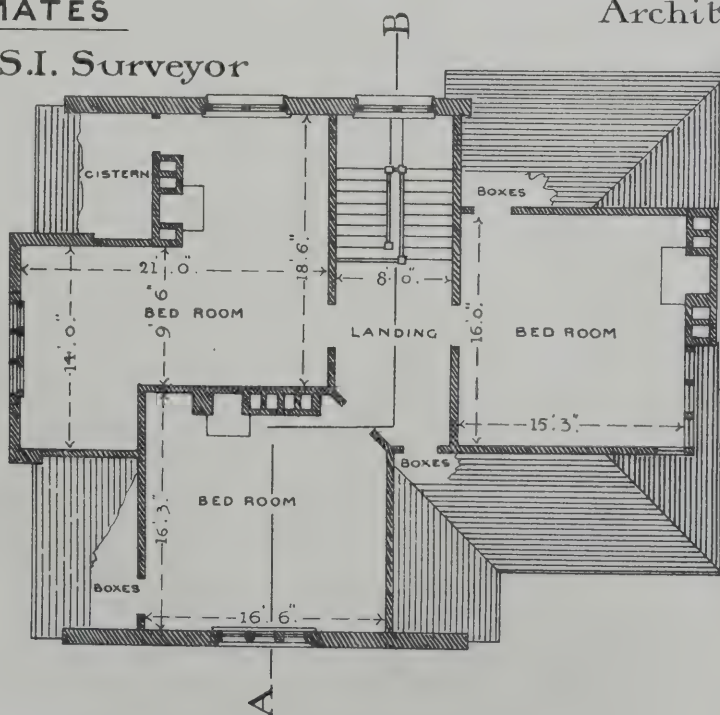
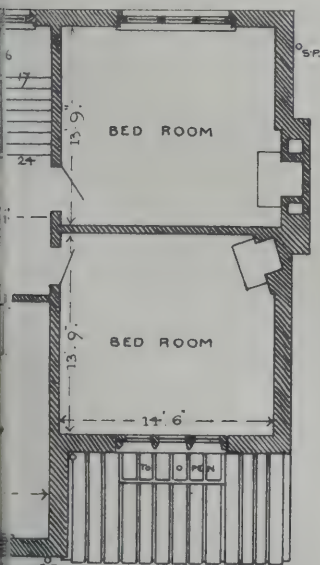
# E-CLASS HOUSE AT HAMPSTEAD

ING PAPERS ON

WITH DETAILED ESTIMATES

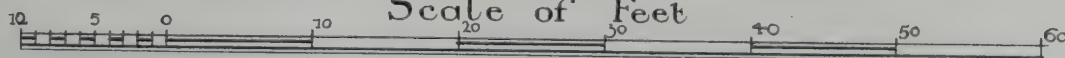
Maurice B. Adams F.R.I.B.A.  
Architect

by H. Lovegrove F.S.I. Surveyor



Upper Plan

Scale of Feet







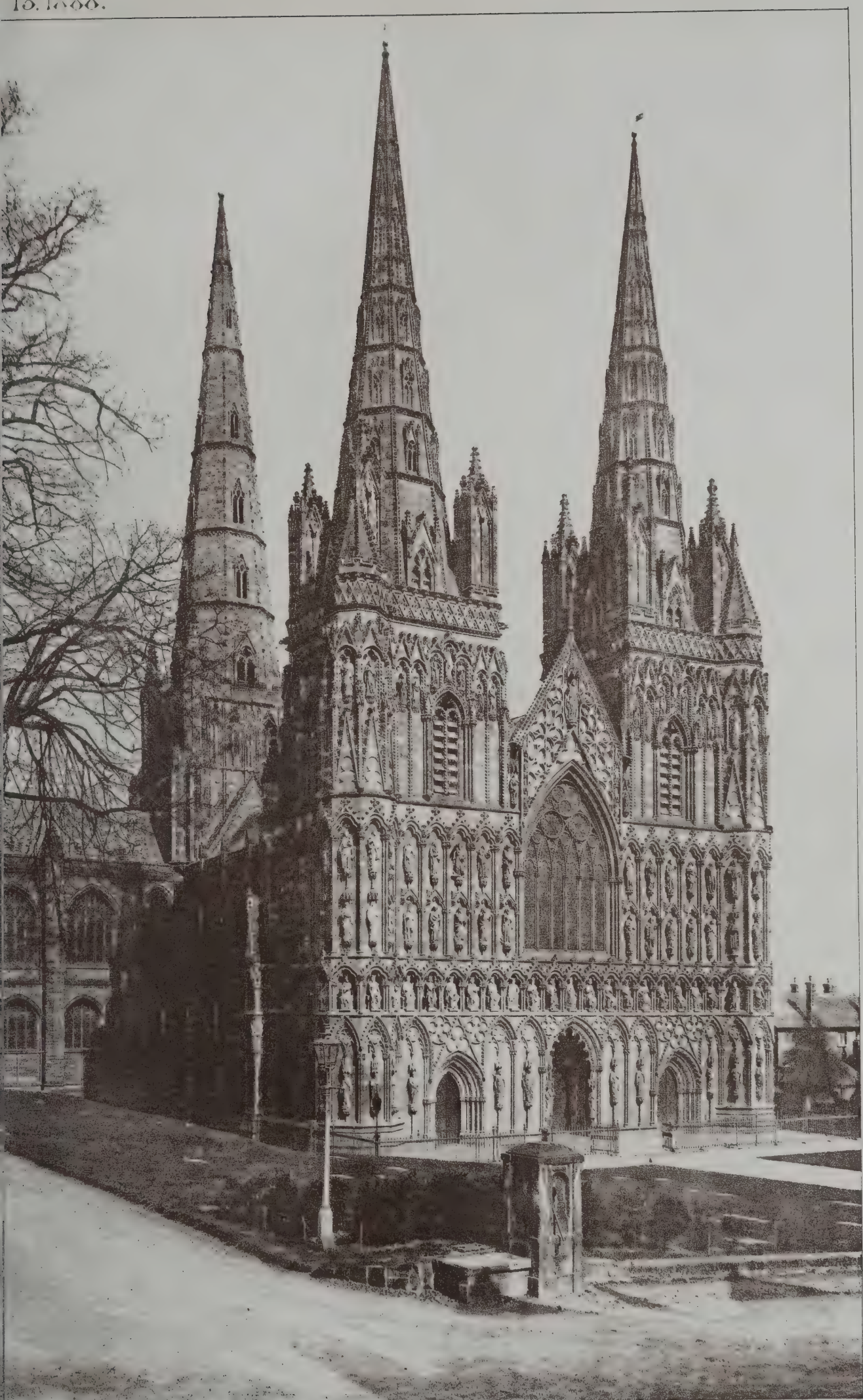












"Photo-Tint" by James Akerman. E. Queen Square, London, W.C.















JULY 13. 1888.

BUSINESS PREMISES, FOREGATE ST., CHESTER.

FOR HIS GRACE THE DUKE OF WESTMINSTER, K.G.

DOUGLAS & FORDHAM ARCHTS.





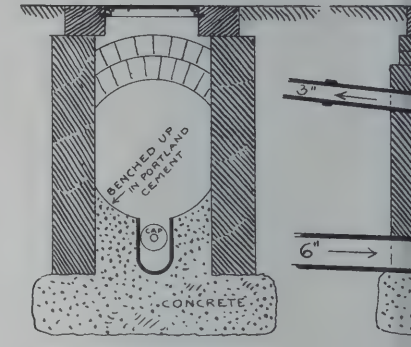
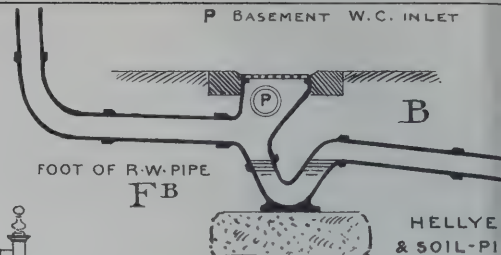








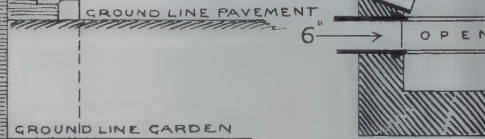
P BASEMENT W.C. INLET



CROSS SECTION OF MANHOLE E

DETAILS OF DRAINAGE

AS ARRANGED FOR A SPECIAL SITE BY WAY OF ILLUSTRATION



PLAN OF  
Inches 12 6 0 1 2 3 4  
SCALE OF

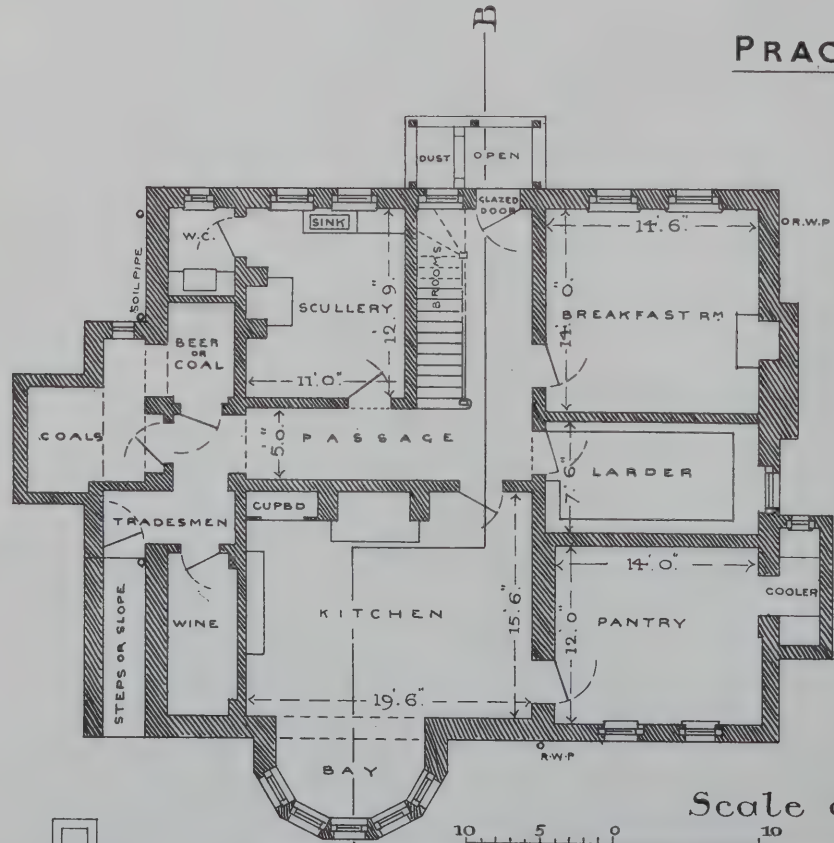


Back Elevation

A CORNER MIDDLE

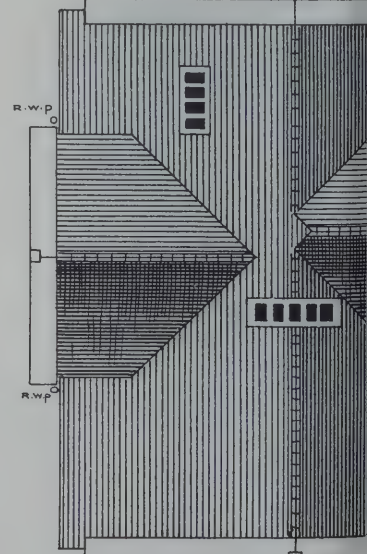
ILLUSTRATION

PRACTICAL ARCHITECTURE



OVERS AIRTIGHT  
IRON DOOR

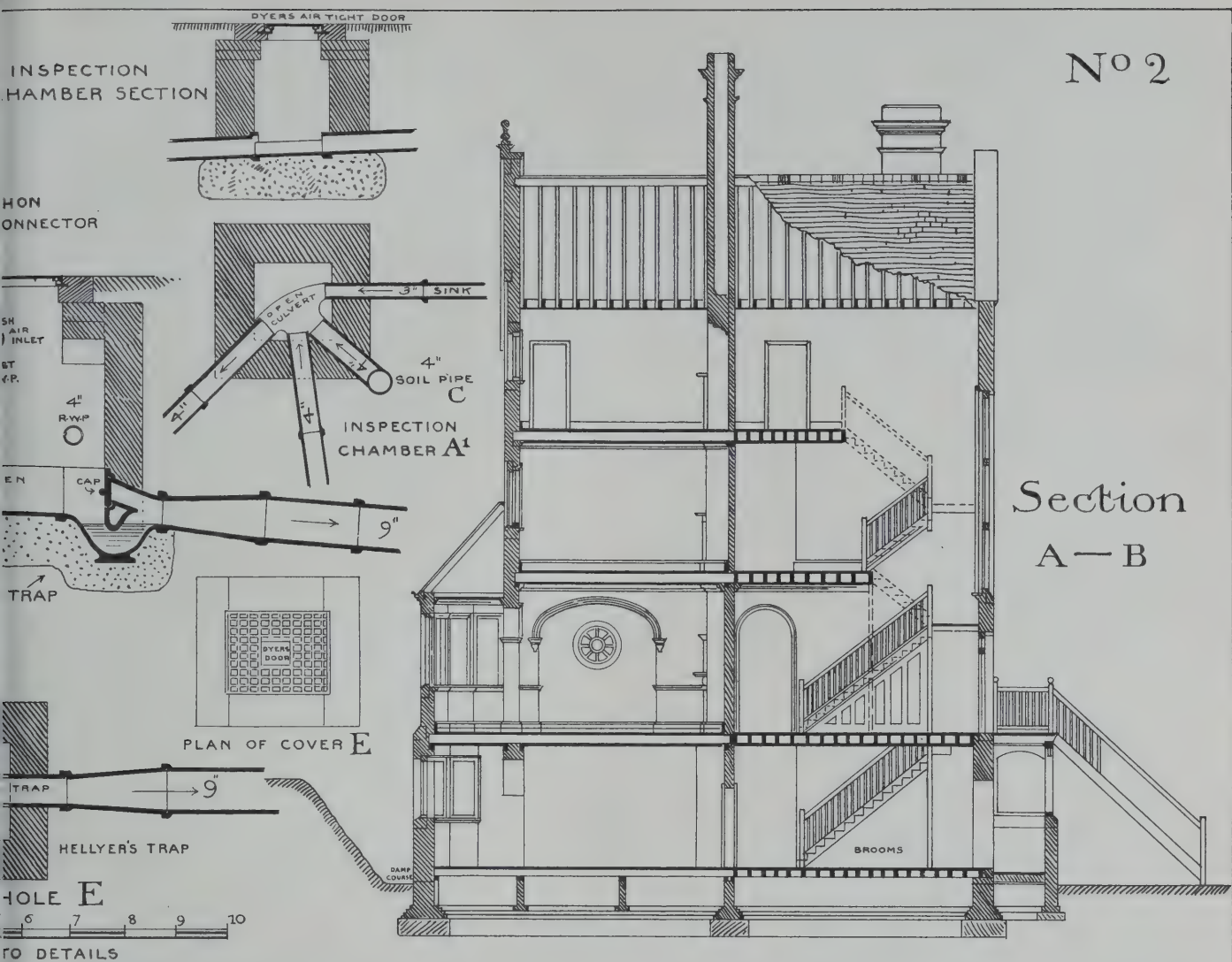
Basement



Roof P



JULY 13. 1888.

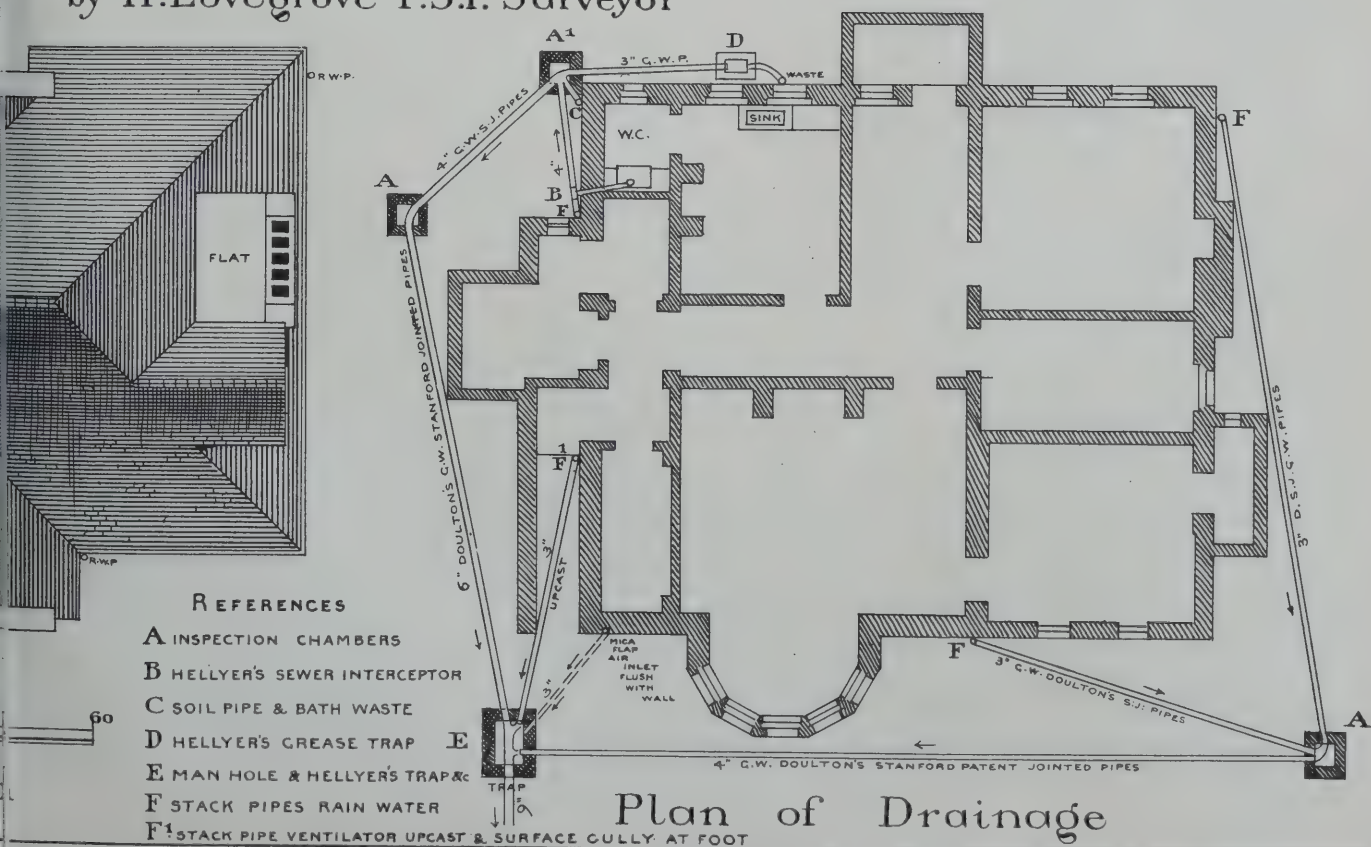


# CLASS HOUSE AT HAMPSTEAD

PAPERS ON  
WITH DETAILED ESTIMATES

Maurice B. Adams F.R.I.B.A.  
Architect

by H. Lovegrove F.S.I. Surveyor









# Engineering Notes.

**OXFORD.**—A new foot-bridge, erected for public access to the new public recreation ground acquired by the Bedford Corporation on the south side of the river, was opened on Tuesday last, July 11th, by the Marquess of Epsom. The bridge consists of two light-iron segmental ribs, 100ft. clear span and 12ft. deep, from which is suspended the footway by 12 in. diameter. The footway is of cast-iron laid on corrugated flooring 12 in. deep, 12 in. pitch, and 1 in. thick. The offset of the main ribs is 25ft. above the line at the centre of the river, and the curved footway 15ft., both springing from the river bank so as not to impede the along the ornamental gardens on the side. The main ribs each consist of four angle-irons 4 in. by 3 in. by 1/2 in., braced together by flat bars 3 in. by 1/2 in. and by 1/2 in. An ornamental handrailing is added to the suspension rods on each side. Total weight of ironwork, including flooring, ornamental posts, bolts, &c., was under 10 tons. The engineer for the work is Mr. J. Webster, M.Inst.C.E., of 25, Lord-street, London, who also designed the large iron bridge for the Bedford Corporation, which was opened three years ago.

**BUXTON AND HINDLOW RAILWAY.**—This line is to be forthwith constructed. It will be five miles in length. The connection will be at the goods junction of the London and North-Western Railway at Buxton Station, where the rails will be carried over a bridge to be built above the Midland Railway and by a trestle across Spring Gardens to Sylvan Park. Higher Buxton it is proposed to build a new line. The new line will connect with Hindlow, a station on the High Peak Railway, which is a couple of miles from Longnor, a town on the Staffordshire border. The line will be for passenger and goods traffic, and will probably continue the line to Ashbourne and along the valley to Ashbourne.

## CHIPS.

**Belton Church, Rutland,** one of the few remaining examples of the "three-decker" pulpit and reading desk has been replaced by the past week by a pulpit, reading-desk, and lectern, all of pitch-pine. The new furniture has been constructed by Mr. J. Grocock and Mr. Stevenson.

**Souls' Church, Every-street, Manchester,** has reopened, after being decorated by Mr. Bennett, of South King-street, in that city. Additions to St. Thomas's Church, Monmouth, have recently been completed, Mr. F. A. All being the architect. The church is now decorated throughout by means of one of Shorland's underground hot-air stoves fixed under the floor, supplied by Mr. G. H. Shorland, of Manchester and London.

**Thomas Chatfield Clarke, J.P., F.R.I.B.A.,** has been invited to stand as the Liberal candidate for the Isle of Wight at the next election.

**Muckle Cross** which has been presented to the county by Mr. McAndrew, of Romford, a native of Yorkshire, was formally handed over to the county by the town council on Tuesday by the Mayor. The cross is a facsimile of the one presented to Edinburgh by Mr. Gladstone a few years ago and has cost over £300.

**J. W. Trounson, Penzance,** has been appointed the architect for the new Post Office at Penzance, St. Ives, Cornwall.

**Longtown town council** have just completed negotiations with the North Staffordshire Railway Company, and have arranged to pay £1,250 to the company in consideration of their replacing, at an estimated net cost of £2,400, the present obstructive viaduct carrying the railway over the end of Market square by a single-span girder bridge.

**Plans for the addition of a lecture hall, reading rooms, lavatories, and extensive alterations to the old Liverpool Club premises, Mortlake,** were completed last week. The lowest was that of Mr. J. W. Kingston, £1,117. The new buildings will present a front of 42ft. to Worple-road, and will afford accommodation for 500 members. The lecture hall is estimated to hold nearly 300, and the reading room is large enough for three full-sized tables. The architect is Mr. T. C. Barralet, of Chambers, Richmond.

## COMPETITIONS.

**CAMBRIDGE.**—The committee of the Cambridge Town Council have awarded the first premium of 50 guineas to Mr. G. McDonald, A.R.I.B.A., of Arundel-square, London, and the second premium of 25 guineas to Mr. Henry G. Ladson, M.S.A., of Upper Edmonton, N., for the selected designs in the recent open competition for the enlargement of their Guildhall—limit of expenditure, £16,000.

**EDINBURGH.**—THE S.S.C. LIBRARY.—The Council of the Society of Solicitors of the Supreme Court, after considering the reports and information received from their assessors, Messrs. Burnet and Son, have unanimously resolved that in their opinion the plan bearing the motto "Wisdom, Health, and Beauty" is entitled to the first place in the competition, and that the plans bearing the mottoes "Scottish Seventeenth Century" and "S.S.C." are entitled, the former to the first and the latter to the second premium. The author of the plan "Wisdom, Health, and Beauty" is Mr. James B. Dunn, 116, George-street, Edinburgh, the author of the second premiated design for the Edinburgh Public Library buildings. The second design is by Messrs. McArthy and Watson, 137, George-street, and the third is by Mr. G. Washington Browne. The style of the new library buildings, as designed by Mr. Dunn, is a free adaptation of the Scottish Baronial with Tudor features. The architect has placed the library, reading-room, and stores in the topmost and second topmost story of the building. The four lower stories of the building, which are designed as artisans' dwellings, are quite plain. The upper part of the elevation to the Cowgate shows a centre portion with lower side wings—the main building, which contains the library proper, rising to a height of 90ft. above the street. It depends for effect partly on the large bays or oriels, which help to light the library, and the two side wings, and partly on the numerous chimneys, which are a feature in the elevation. The windows have been corbelled out from the wall to the distance of 4ft., and the chimneys have been treated with similar projections. The western corner of the building is finished off with a small hexagonal tower corbelled out from the wall as in the case of the windows. The principal rooms will be in the topmost flat. These consist of a reading-room, the library, and a hall capable of accommodating 200 persons. The access is from Parliament House, and the entrance is in the west corner of the building into a large vestibule, facing which, and occupying the western wing of the building, is the reading-room, measuring 26ft. by 30ft. To the east of the reading-room, occupying the main part of the building, is the library-room, measuring 67ft. by 38ft. It is divided into five bays on either side; and the bookcase blocks, instead of being furniture merely, are treated as part of the architectural design, each block being terminated by a wide pilaster towards the room, these being connected by a series of elliptical arches springing from boldly-designed trusses. The room is lighted from the four sides, this being attained by the side wings being kept low. With regard to the roof-lights, the architect proposes a series of double windows—an outer and an inner—the inner of tinted glass, so as to temper the lighting and prevent draughts. At the east end of the library are the lavatories and the librarian's room. In the eastern wing is the hall, entered from the vestibule by a separate corridor. A stair from the vestibule leads to the flat below, where there are four consulting-rooms, provision for heating, and book stores, which, with the library, will accommodate 70,000 volumes. A fireproof floor separates this flat from the model dwellings beneath. The drainage from the library portion of the building will be entirely separated from that of the tenements beneath, so as to decrease the number of ventilating pipes. A ventilating shaft runs the entire length of the library premises, and the vitiated air will be extracted by a Boyle's air-pump ventilator. At night Strode's ventilating sunlights have been proposed as a help to extracting the vitiated air. The estimated cost of carrying out the design is £13,000.

**WOLVERHAMPTON.**—At Friday's meeting of the Wolverhampton Board of Guardians, the Cottage Homes Committee, appointed to con-

sider the question of erecting cottage homes for the workhouse children, presented their report. It stated that the committee had received 17 sets of plans from local and other architects. The highest of these set down the estimated cost at £40,000, and the lowest put it at £13,040. A sub-committee was appointed to examine the plans, which made the following selection: Mr. G. H. Stanger, estimated cost £14,561; Messrs. Cox and Johnson, £13,897; Mr. Arkell, £13,248; Messrs. Essex and Nicholl, £13,800; Mr. Veall, £13,040; and Messrs. Fleming and Edwards, £15,900. Of these the committee selected the first three for presentation to the Board. They preferred the plans of Mr. G. H. Stanger, and advised their adoption. Mr. T. D. Greensill announced that next week he would propose the acceptance of the committee's recommendation. The Board would then be supplied with the observations of the three architects, and the report of their adviser, Mr. Beck.

## ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

**BIRMINGHAM AND MIDLAND INSTITUTE.**—No fewer than 570 persons took part on Saturday in the ninth annual excursion of this Institute, which had as its destination Worcester and Holt Fleet. A special train conveyed the party from Birmingham, and on reaching Worcester the Rev. Canon Creighton conducted the visitors through the cathedral. The party then embarked on steamers, and started for a trip up the Severn to Holt Fleet. At seven o'clock a party of sixty, led by Mr. Oliver and Mr. Twigg, started to walk through the charming district of Ombersley and Westwood Park to Droitwich, where the return train picked them up. The remainder of the party, after lingering another half-hour at Holt Fleet, returned to Worcester by the steamers in time to catch the train.

**DUNDEE INSTITUTE OF ARCHITECTURE, SCIENCE, AND ART.**—The fifth annual report of this Institute states that the prizes for the past session have been awarded by the referees, Messrs. James G. Orchard and John Kennedy, as follows:—Drawing of Doorway, Dryburgh Abbey, James Burnett, 104, Commercial-street, Dundee; Etching, "Church of St. Maclou, Rouen," R. D. Winter, 26, Overgate, Dundee; Photographs of Buildings, "Modern Buildings of Dundee," Alexander Wilson, 36, Nethergate, Dundee; Modelled Capital, James M. Sheriff, 36, Ronald-street, Glasgow; and paper on "Building Mortar and Cement," J. T. Maclaren, Ferrybank, Cupar Fife. The following gentlemen have been elected as office-bearers for session 1888-9:—President, Thomas Saunders Robertson, architect; vice-president, Charles Ower, A.M.I.C.E.; ordinary members of council, Alexander Hutcheson, F.S.A., architect, and Wm. Mackison, F.R.I.B.A., burgh engineer; associate members of council, Robert Smith, solicitor, William Stephenson, builder; honorary secretary, Leslie Ower, architect, 104, Commercial-street, Dundee; honorary treasurer, J. J. Henderson, architect, 8, Bank-street, Dundee; auditors, G. A. Harris and James Bruce, architects.

**MANCHESTER.**—On Saturday last the members of the Manchester Architectural Association had an excursion to South Wingfield Manor House, Derbyshire. On arriving at Matlock Bath the party were taken in a waggone across the hills, a distance of seven miles, to Wingfield. This once splendid mansion is situated on a hill, and a grand view of the surrounding country of Derbyshire is commanded from the high tower. The building is supposed to have been erected by Ralph, Lord Cromwell, in the reign of Henry VI., and the arms of the Cromwell family occur on the battlements of the hall porch. The building is now a mere ruin, but has still some interesting detail left, and the arrangement of various apartments can pretty nearly be made out, the outer court being, no doubt, a farmyard, but the farm buildings are nearly all destroyed. In the inner court the buildings are more perfect, especially the hall with its porch. At one end of the hall is a fine bay window, the tracery of which is all complete, as well as the richly-panelled stone ceiling over bay. At the other end of hall are placed the offices and kitchens. Over the offices was no doubt the chapel,



though it is now called the "State apartment." The traceried window in this part is, most certainly, the richest in the house, with a good crocketed hood-mould. Under the hall is a range of vaulted cellars, which is called the "Crypt," but is really the wine-cellars. In the centre of each bay of the vault is a round, flat boss, with a wheel-like panelling encircling same. The ribs are massive, and the central pillars short and thick, with plain impost. On the western side of the inner court are remains of a range of Elizabethan buildings, in which Mary, Queen of Scots, is said to have been imprisoned. The members of the Association found ample material for making measured drawings and water-colour sketches of various parts.

**SOUTH WALES SKETCHING CLUB.**—The members of the South Wales Sketching Club and Art Society held a meeting on Tuesday week at their rooms, at 8, Working-street, Cardiff, Mr. T. H. Thomas, R.C.A., presiding. The hon. secretary (Mr. J. A. Sant) reported that a number of sketching groups had been held during the past few weeks, and that several meetings for drawing from models had taken place. Mr. Edwin Seward, the vice-chairman, informed the meeting that Lord Windsor, president of the society, had invited the members to St. Fagan's Castle, when an address will be delivered by Mr. W. Severn. Arrangements for holding a public exhibition at Cardiff in September were then discussed, and referred to a committee to report thereon.

### CHIPS.

A museum of Biblical antiquities has been formed in the office of the Church of England Sunday Schools Institute in Serjeant's Inn, Fleet-street, E.C., which is open free to the public every day.

At Trinity Congregational Church, Reading, which has recently been enlarged and improved, the first section of a scheme for fitting the windows with stained glass has been completed. Four of the six aisle windows and the large triplet windows have been filled, the subjects being:—"The Adoration of the Magi," "The Sermon on the Mount," "Christ Blessing the Children," "The Crucifixion," and "The Resurrection."

On Saturday Mr. S. H. Terry attended the Public-buildings, Soho-road, for the purpose of inquiring into the proposal of the Handsworth local board to borrow £5,000 for blue brick paving, asphalt, kerbing, and other street improvements and for the purchase of a steam roller.

A new theatre has been erected at Nelson, and special attention has been paid to the ventilation, Robert Boyle and Son's latest improved patent self-acting air-pump ventilator being adopted for the extraction of the vitiated air.

At Bury St. Edmunds Assizes, before Baron Pollock on Wednesday, an action was brought against Mr. W. Salmond, town clerk, for an alleged illegal acceptance of 500 guineas beyond his regular salary and allowances, in payment for services said to be outside his agreed duties, in connection with the new sewerage works. The judge held that the Corporation had a right to make the payment, and gave judgment for the defendant with costs, but stayed execution to allow of an appeal.

Mr. Thomas C. Coulthurst, for the past nine years borough Surveyor of Derby, and previously an architect in practice at Barrow-in-Furness, died last week of paralysis at an advanced age. The funeral took place on Wednesday last, and was attended by the Mayor and Corporation, and the official representatives of the Freemasons and other bodies, and numerous private friends.

The new dispensary at Castle Green, Bristol, was opened on Tuesday. It has been built from designs by Mr. W. V. Gough, of Bridge-street, Bristol, and is faced with salmon-coloured bricks with buff terracotta dressings. The building is entirely heated by gas stoves on a new system which warms and ventilates at the same time. The contractor for the work has been Mr. C. A. Hayes, Commercial-road; and the stained glass was supplied by Messrs. Bell and Son, of College Green, Bristol. The dispensary was illustrated in the BUILDING NEWS for Jan. 28, 1887.

Operations have now commenced at Manchester Cathedral, under the direction of the cathedral architect (Mr. J. S. Crowther), for araising what is known as Brown's Chapel—forming the south-west side of the nave. The work will be completed by the beginning of September. The Gordon memorial window in the Ducie Chapel, on the north side of the nave, will be placed there before the meeting of the Church Congress.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASMORE EDWARDS.

### TERMS OF SUBSCRIPTION.

One Pound per annum (post free) to any part of the United Kingdom; for Canada, Nova Scotia, and the United States, £1 8s. 8d. (or 7dols. 30c. gold). To France or Belgium, £1 8s. 8d. (or 36fr. 80c.). To India (via Brindisi), £1 17s. 4d. To any of the Australian Colonies or New Zealand, to the Cape, the West Indies, or Natal, £1 10s. 10d.

### ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of eight words, the first line counting as two, the minimum charge being 6s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

### SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after.

All Situation Advertisements must be prepaid. Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX, XL, XLI, XLIV, XLV, XLVI, XLVII, XLVIII, XLIX, L, LI, LII, LIII, and LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—G. T. K.—H. and R.—C. and Co.—A. W.—K. and Co.—H. S. R. and Co.—A. E. Co.—B. S. and Co.—D. and H. W. W.—H. M. and Son.—W. H. H.

W. C. B. (Although it is desirable that offsets should be less than, or seldom exceed, a chain, in practice it is sometimes impossible to follow the precept. Some surveyors say 50 links is long enough.)

## Correspondence.

### STRAINS.

To the Editor of the BUILDING NEWS.

SIR,—In the article upon this subject which appeared in your issue of the 6th inst. half of

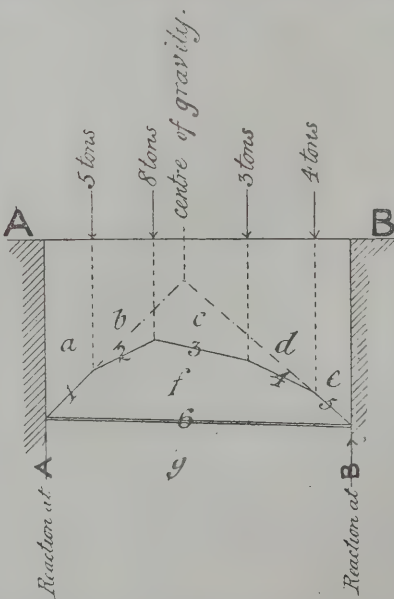


Fig. 6 was, by some mishap, omitted. It consisted of a sketch of a girder with funicular

polygon, to which the polar diagram (which was printed) was reciprocal, line 1 being parallel to line 1 on the diagram; line 2 to line 2, and so on. As either half of the diagram would be utterly unintelligible without the other, and as in future articles this simple method of ascertaining the reactions of supports will be much used, I should esteem it a favour if you would insert this correction in your next issue.—I am, &c., G. A. T. MIDDLETON.

### ARCHITECTURAL WELSHERS.

SIR,—The following letter is, I think, worth publishing. I have, of course, declined the assistance of the Welshman.—I am, &c., C. P. E.

### [COPY.]

SIR,—There is a large competitive meeting held in Wales once a year, in which prizes for various subjects are offered. Among the list this year I find a prize of £5 is offered for the best interior isometrical view of an entrance hall with staircase, the selected design to be the property of the committee. The subject is limited to Welshmen.

If you would care to compete I would take it in my own name, providing you give me £1 out of the £5 if successful. This can easily be done.

The drawing has to be in hand by the 21st of this month. Kindly let me hear as early as you can.—I am, Sir, yours truly,

### PORTLAND STONE AND BATH STONE.

SIR,—In your "Wayside Notes" contained in your issue of 6th inst. I venture to think you have rather strained your remarks in your endeavour to make amends to the Bath stone firms for your remarks in your leader of 22nd ult., by stating Bath stone "is without a rival as a constructional material," and it might probably be therefore a detriment to Portland stone, which claims to be, and, I think, is, "without a rival."

You cite two important and fine buildings (the latter of which I admired, and alluded to the weathering of the stone only recently) built twenty and thirty years since respectively; but cannot we (Portland stone merchants) produce evidence in the shape of fine buildings of two and three centuries' standing, and which will evidently still withstand the test of many centuries to come?

Trusting you will kindly rectify this in your next,—I am, &c., Isle of Portland. F. J. BARNES.

[We had no intention of reflecting on the merits of Portland stone or any other building material, and hope all stone merchants' goods are not so soft as their sensibilities seem to be. Our expression, "without a rival," must of course be read with the context. There are some uses for which lath-and-plaster "is without a rival"; but no one would pronounce it generally the superior of stone. Our note last week was simply intended to remove any unfair impression it seemed to us, on reading our own words in print, might have been left on the mind of any reader, and not in any way to reflect on or raise comparisons with any other material.—ED.]

The ceremony of laying the foundation-stone of new schools for the parish of St. Bartholomew the Great, West Smithfield, was performed on Friday afternoon by the Duchess of Albany. The new building is intended to provide accommodation for 120 boys, 100 girls, and 100 infants, in addition to night-schools and evening classes for the poor in habitants of the parish, and the estimated cost is £2,160. Mr. Aston Webb is the architect. The site is the vacant land south of the building which up to the time of Henry VIII. formed the Lad chapel of the Priory Church, and was possibly the burial-ground of the Canons. It was purchased in 1834 by the Restoration Committee. The boys' school is at present held in the north triforium of the church, and the girls' school in an adjoining building, both of which have been pronounced by the Government inspectors unsuitable for the purpose.

The fourteenth annual conference of the Sanitary Association of Scotland was held in the Corporation Galleries, Glasgow, on Thursday and Friday last, with a large attendance of members. Dr. John C. McVail, medical officer of health for Kilmarnock, president of the Association, devoted his address to a discussion of the methods of preventive medicine.

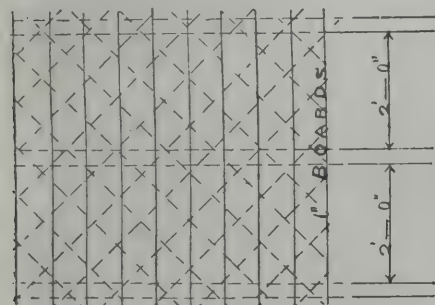
The corporation of Liverpool voted last week 100 guineas to Mr. T. Sheldermine, the corporation surveyor, and 60 guineas to Mr. Dunscomb, civil engineer, for their services in connection with the inspection of the theatres.



## Intercommunication.

### QUESTIONS.

[9682.]—**Strains in Floors.**—How do you calculate the strength of a floor formed by several layers of boards nailed one on the top of the other—the first layer to be nailed at an angle of  $45^\circ$  to the joists, the second at right angles to the first, and the third at right angles to the second? In the following figure, what would be the



breaking weight at the weakest point, and what formula would it be worked by?—X. Y. Z.

[9683.]—**Rusty Stove.**—Can any reader inform me what to put in a stove in a chapel to keep rust off in a damp situation?—W. WATERS SOUTHERN.

[9684.]—**Free Public Library.**—Would some kind reader inform a student where a good free library can be seen, or where one is illustrated, or whether any books on them are published? Any information regarding fittings would be useful.—M. WEBB.

[9685.]—**Quality of Doors Fixed.**—A joiner having fixed in doors to a new house agreed to be of a certain size, finds, on coming to hang same, that they are too narrow for the frames, consequently fixes slips  $\frac{1}{4}$  in. to 1 in. broad along same to make up size of doors to suit openings, and considers this workmanlike, but the proprietor does not. Is the latter justified in refusing same and asking that new ones be supplied as substitutes, or an allowance made if first fixed are allowed to remain?—FAIRFAXTON.

[9686.]—**Tall Chimney Shaft.**—In a tall chimney we are building some of the rings of brickwork are specified to be in cement instead of mortar. What advantage is there in this? I notice in Bancroft's practical treatise on "Tall Chimney Construction," there is an example of a waterworks shaft similarly constructed with cement rings at intervals; but the author does not give any opinion as to the advisability of so building.—DON.

### REPLIES.

[9676.]—**Dry Rot or What?**—Certainly you are confronted with dry rot, and nothing else; but don't be in a hurry to adopt the wholesale clearing-out process so strongly advocated by many men. I believe dry rot in a piece of timber can be as effectually killed as any disease which takes hold of the human frame. Be lavish with your ventilation, and do not rest content until you are satisfied by experiment that a current of air is passing under every part of the floor. Without this, any amount of cutting away will be in vain, while if this be ensured I feel confident that only that woodwork need be removed which is so far decayed as to be unfit for its purpose. In support of this opinion, I would refer "J. H." to my letter on the subject in the "B. N." of the 9th of March last, and I should be pleased to show him what was done in the instance mentioned therein.—ARTHUR CROW, 35, Queen Victoria-street, E.C.

### CHIPS.

A mansion which has been in progress at Coombe, near Shaftesbury, since the spring of 1885, has just been completed. The house is built of green sandstone, and is fitted up throughout the main wing with high-class joinery of oak and teak. A massive oaken staircase with carved balustrade and newels adorns the great hall. The house is heated throughout by hot water, and lighted by the Electric Light Company. Mr. E. Lowry Whyte, of 81, Charing-cross, is the architect, and the contractor was Mr. W. Dart, Crediton, Devon, who performed the work to such satisfaction that the owner, Mr. Mark Hanbury Beaufoy, presented him, on its completion, with a massive silver punch-bowl with a suitable inscription. Although the cost of this mansion and stables has been nearly £20,000, no clerk of works has been employed throughout, the duties being respectively fulfilled by Mr. W. J. Dart for the house, and Mr. S. B. Francis has been Mr. Dart's representative for the erection of the stables.

One of the smallest Devonshire parish churches, at Horwood, N. Devon, is to be restored from designs of Messrs. Hayward and Son, architects, Exeter. Mr. W. Dart, Crediton, is intrusted with the work.

On Friday a Local Government Board inquiry was held at the Town Hall, Margate, before Mr. Arnold Taylor, local Government board inspector, relative to an application by the town council to borrow £10,000 for the Dane Waterworks, and £716 for works of street improvement.

## WATER SUPPLY AND SANITARY MATTERS.

SANDBACH.—Mr. S. J. Smith, an inspector under the Local Government Board, held an inquiry at Sandbach on Wednesday week, respecting applications made by the Sandbach Local Board for sanction to borrow £7,500 for works of water supply, and £4,000 for building a market house. Mr. Bowers, architect, produced and explained the plans for the market house, and said £4,000 would cover all the proposed expenditure. There was no opposition. The chairman of the Board explained the water scheme and the proposal to build pumping works at Taxmere, about a mile from the town. The estimated cost of that scheme, devised by Mr. Wyatt, C.E., was £7,500.

THIRLMERE WATERWORKS.—The members of the Manchester City Council visited Thirlmere and a portion of the line of aqueduct on Thursday and Friday. The present area of Thirlmere is 328½ acres. If it is raised 50ft., as sanctioned by Parliament, the area will be increased to 793 acres, and the capacity to 8,130,686,693 gallons. It is, however, in contemplation at present to raise the level only 30ft. In the pipe-laying there is 13½ miles of tunnelling, 37 miles of cut-and-cover, and 44 miles of siphon pipes, the total length from Thirlmere to Prestwich being 95½ miles. At Straining Well, the commencement of Dunmail Raise tunnel, explanations of the work were given, after which the shaft at Wythburn was inspected, and the south end of Dunmail Raise tunnel. On Friday the party left Grasmere for White Moss, and examined the work there. After the inspection of Nab Scar tunnel and the cut-and-cover portion of the aqueduct in Rydal Park, the drive being continued to Moor Howe tunnel, Troutbeck, examining the line of siphon pipes which cross the valley. After this the south end of Moor Howe tunnel was inspected, and the drive taken forward to Kendal, where the inspection ended. Contract No. 5, which will bring the aqueduct nearly as far south as Lancaster, will be let this month. The tunnelling on this section will be about a mile and three-fifths; the rest of the work will be "cut-and-cover." The section begins at a point three miles east of Milnthorpe station, and terminates three and a-half miles to the south-east of Lancaster.

## STATUES, MEMORIALS, &c.

EXETER.—A strong feeling having been manifested that a memorial of some kind should be placed in the Exeter Cemetery to mark the graves of the 200 victims of the theatre fire, the Fire Relief Committee recently advertised for designs and tenders from sculptors and statuary for a suitable monument. At their meeting on Friday evening, the recommendation of their subcommittee that the design of Mr. Harry Hems, sculptor, of Exeter, be accepted was adopted. Mr. Hems's design consists of a monolith of black Ballinasloe marble, 14ft. high, upon a plain base of grey Devonshire granite. The form assumed is that of a plain Celtic cross, and upon the circle that occurs at the junction of the arms and shaft of the cross will be carved in raised letters on one side "In memoriam," and on the reverse, "5th September, A.D. 1887." The cross will be placed on the spot where the unidentified remains are buried.

New waterworks were inaugurated at Howden in the East Riding on Monday week. Mr. Fairbank, of Driffield, is the engineer, and the contractors have been as follows:—Well and boring, Mr. J. Villers, Beverley; pipes, laying, and softening machinery, Mr. T. Bell, Market Weighton; pumping machinery, Messrs. Haley Brothers, Bramley, near Leeds.

The foundation-stone of the new workhouse for Gateshead was laid on Tuesday. The building, which will cost between £46,000 and £47,000, is being erected by Mr. Walter Scott, of Newcastle, from plans by Messrs. J. H. Morton, of South Shields, W. L. Newcombe, of Newcastle, and W. H. Knowles, of Gateshead. Mr. Caris is the clerk of works. Accommodation will be provided for a thousand inmates.

St. Andrew's Church, Monkton Wyld, now possesses a complete rood. The chancel screen has been entirely transformed by the addition of images and cresting on the beam, together with enrichments to the tracery and panels below. The rood rises to the height of about 8ft. above the doorway in the centre of the screen from a band of tracery which connects the pedestals for SS. Mary and John. Beyond these are kneeling figures of angels, vested as acolytes, and bearing rich candlesticks of gilt copper; while the extremities of the beam are occupied by six winged seraphim. The architects were Messrs. H. A. Hudson and F. C. Eden, and the makers Messrs. Luscombe, of Exeter.

Messrs. Robertson and Patley, of Long Acre, surveyors, have dissolved partnership.

## LEGAL INTELLIGENCE.

ILLICIT COMMISSIONS AT GASWORKS.—Samuel Hunter, who was manager of the Salford Corporation Gasworks, pleaded guilty at the Central Criminal Court in March to charges of perjury and embezzlement. He had defrauded his employers in connection with contracts for the purchase of coal by secretly accepting commissions from the contractors. He had also brought an action for libel against Mr. Ellis Lever, who made known his misconduct and defalcations. Mr. Justice Hawkins sentenced him on Friday to five years' penal servitude for perjury, and to concurrent terms of one year's imprisonment on two other charges, the sentences to date from March last.

THE CONDITION OF GLOUCESTER CATHEDRAL.—Mr. Justice Chitty delivered judgment in reference to an application by the Dean and Chapter of Gloucester for a grant of £1000 for repairs to the cathedral out of a trust fund known as the Wharfedale Ecclesiastical Charity. It appeared that the fund was established in 1855 for the repair of churches in the ancient diocese of Gloucester, and consisted of some £30,000. In consequence of the depreciation of land from agricultural depression, the income of the chapter had been reduced by 40 per cent., and whilst every day the repairs of the cathedral were becoming more and more urgent, the chapter's position to provide for them was becoming worse and worse. There was an urgent need for immediate outlay, as portions of the cathedral were, according to the architect's report, positively perishing. The Dean and Chapter under the circumstances applied to the petitioners for a grant of £1,000, to be chiefly expended on structural repairs, but in some small part in providing seats for the poor. Mr. Justice Chitty said that he was unable to advise the petitioners that the grant asked for would fall within the scope of their trust. It was impossible to suppose anything else except that the foundress of the charity had intentionally excluded the cathedral from her benefits. But on the other hand, had the foundress been able to foresee in 1855 the state of things in 1888, she would have said "the cathedral, of course, is of all other churches that which I most care for," and would have expressly comprised it in the trust.

## PARLIAMENTARY NOTES.

THE FADING OF WATER COLOURS.—In answer to Sir A. Borthwick, Mr. Jackson said, on Monday night: The Committee of Artists have expressed their opinion on the report of the scientific investigation into the action of light on water-colours by Dr. Russell and Captain Abney. The report, with the opinion of the Committee of Artists, has been laid on the table of the House, and will, I hope, be in the hands of members in a few days. No special precautions—other than those which are always used—have been taken to protect these drawings pending the result of the inquiry.

### CHIPS.

The memorial statue of the late Bishop Moberley in the Lady Chapel of Salisbury Cathedral was unveiled on Monday. The figure, which is of white alabaster, is in a recumbent position, the hands in an attitude of prayer, and the pastoral staff is at the side. At the head and feet are figures of angels in a kneeling position, and above are four alabaster medallions representing events in the life of the deceased prelate.

Strawberry Hill Estate, which, in consequence of the death of Baron de Stern, has again come into the market, failed to attract a purchaser at Wednesday's sale, the highest bid being £15,000, whereas the reserve was about five times that amount. The collection of art furniture, pictures, and ornaments will shortly be sold on the premises.

By the will of the late Hugh Robert Rump a sum of over £2,000 has been left to the parish church of Wells-next-the-Sea, which was struck by lightning and almost burned to the ground on August 3, 1879, and has since been restored from plans by Mr. Herbert J. Green, of Norwich. The will directs that the money shall be expended in the providing and fixing a peal of eight bells, a new organ, new oak benches, &c.

A Committee of the House of Lords passed on Tuesday the Bill promoted by the London Tramways Company, which authorises that company to extend their system from Clapham to Tooting. The proposed tramway will be a double line throughout.

The first sod of the Victoria Infirmary at Lingside, Glasgow, was cut on Friday last. The infirmary will adjoin the Lingside Established Church, and will cost about £50,000. Messrs. Campbell, Douglas, and Sellars, of Edinburgh, are the architects.



## Our Office Table.

THE annual report of the director of the National Gallery to the Treasury for the year 1887 states that six pictures were purchased during that period—viz., "The Holy Family," by Marcello Venusti, purchased out of the Lewis Fund; "The Blood of the Redeemer," by Giovanni Bellini, and "A Muse Inspiring a Court Poet" (?), by Dosso Dossi, purchased out of the Walker Bequest; portrait of a girl, by Domenico del Ghirlandajo; portrait of a man, by Sir Antonio Mor; and portrait of a man, by Heinrich Aldegrever, purchased out of the Walker Bequest. The bequests and donations to the Gallery, eight in number, included "A Distinguished Member of the Humane Society," by Sir Edwin Landseer, bequeathed by Mr. Newman Smith; "Portrait of Sir Samuel Romilly," by Sir T. Lawrence, bequeathed by Mr. Charles Rosilly; "Titania and Bottom," by Henry Fuseli, R.A., presented by Miss Julia Carrick Moore; and "View of the house in which the artist was born," by John Constable, R.A., presented by Miss Isabel Constable. The trustees and director urge on the Government the advisability of further extension of the building. The trustees and director have renewed their application to the Lords Commissioners of Her Majesty's Treasury, urging them to reconsider the question of restoring the annual Parliamentary grant for the purchase of pictures (suspended since 1885), and suggesting that at least the yearly sum paid by the public for admission on students' days (estimated at £1,200), as well as the profits derived from the sale of catalogues, might be placed at the disposal of the trustees for this purpose. Their lordships were unable to accede to this request; but they sanctioned an advance of £2,000 for the purchase of pictures in 1887-88, should an opportunity occur of expending that sum with advantage to the Gallery.

THE pressure of public opinion evoked by Sir William Gregory's recent letter appears, however, to have induced the Lords of the Treasury to relax the purse-strings a little during the past week, for several valuable additions, chiefly portraits, to the National collections have been acquired at prices which will not be regarded as extravagant. For the National Gallery has been purchased, at the Quiddendam House Sale, Reynolds's portrait of Lady Anne Lennox, daughter of the Duke of Richmond, and wife of William, second Earl of Albemarle—the work enlivened for its quality and preservation, for Leslie, in his "Life of Sir Joshua Reynolds." The National Portrait Gallery at Bethnal-green has obtained from the collection of Earl Hardwicke a portrait of Lord Justice Parker, afterwards Lord Macclesfield, by Kneller; another representing the interior of the Court of Chancery in that Lord Chancellor's time, and crowded with portraits of the most distinguished advocates of that day; and a third of Charles Montague, first Earl Halifax. The Trustees of the Irish National Gallery at Dublin have received a portrait of John, first Earl of Clare, Lord Chancellor of Ireland at the time of the Union.

THE Works Committee have reported to the Metropolitan Board of Works in compliance with a resolution of the Board of the 6th inst., that Mr. E. Stimson, Mr. Robert Reid, and Mr. Matthew Miles, auctioneers employed by the Board, having admitted that they have given money to officers of the Board, in connection with the Board's work, the Committee have withdrawn from the hands of Mr. Stimson and Mr. Reid instructions which had recently been given to them to submit to auction properties belonging to the Board, and have decided that none of the three auctioneers above named shall be again employed on behalf of the Board. The report will be considered by the Board to-day (Friday).

A SPECIAL Committee of the London School Board, which has been making some inquiries into the condition of their buildings and works, have submitted the following resolution for adoption by the Board: "That in the opinion of the Board the late architect of the Board is responsible for the absence of proper foundations at the Broad-street School, Ratcliff (Tower Hamlets), and that he be called upon

to make good the loss arising therefrom." The report states that whereas the contract depth of the foundations was 10ft., the depth paid for was 12ft. 8in., 11ft. 9in., and 15ft. 6in. respectively of foundations, which on examination prove to be 7ft. 4in., 7ft. 3in., and 9ft. 9in. The condition of the school in Queen's Head-street, Islington, is also reported to be far from satisfactory.

THE Society of Architects have voted a donation of five guineas to the Draughtsman's Provident Society, and also promised that if draughtsmen support this institution they will give it further liberal help. Mr. Walter Emden has likewise promised a donation of £10, and an annual subscription of £5 for the next five years. We are told that the promoters of the Society have had a hard struggle in overcoming the initial difficulties of the undertaking, but matters have assumed a brighter aspect, and the Society is now on a firm basis. They propose to form an out-of-work fund and register, in addition to the other benefits.

THE new public park which is being laid out at Smethwick for the use of the inhabitants is rapidly approaching completion, and it will be ready for opening towards the middle of August. The park, which will be named "Victoria Park," occupies a situation lying between Bearwood Hill and the Six Ways and Cape Hill portions of the parish. The local board purchased 35½ acres of land formerly known as the Pool Farm estate, having an extensive frontage to Bearwood Hill, at a cost of £7,000. In addition to this, the laying-out of the grounds will entail an additional expenditure of £3,000, bringing up the total estimated cost of the park to £10,000. The whole of the arrangements have been made by the surveyor to the local board, Mr. J. C. Stuart. A boating-pool will be constructed, covering an area of about two and a half acres. About three acres of shrubberies will be distributed over the grounds, which will be supplied by Messrs. Fisher, Son, and Sibbey, of Sheffield. A belt of trees and plants of various kinds will be placed round the park, thereby secluding it altogether from outside view. The means of ingress and egress are numerous. Vases of the value of twenty guineas have been presented by Messrs. H. Doulton and Co.

THE Lancashire and Cheshire Antiquarian Society, anxious to ensure the safety of whatever relics of a past age may be discovered in the course of the Ship Canal excavations, have caused a circular to be printed for distribution among the men, giving illustrations of arrow-heads, stone hammers, axes, &c. They request that anyone discovering stone or bronze implements of this description, ancient pottery, or old coins, or who may make any other discoveries bearing on the ancient inhabitants of the district, will bring them before the notice of the society, and communicate with Mr. E. Leader Williams, C.E., or the society's hon. secretary, Mr. G. C. Yates, of Manchester.

### CHIPS.

The Salford town council has passed a resolution in favour of opening the free libraries on Sundays by 25 votes to 12. A committee had already reported in its favour by eight votes to six, and when a poll was taken a considerable majority of the ratepayers took the same view. The decision of the council was, therefore, a foregone conclusion.

A large clock has just been erected on the church tower at Baconsthorpe, Norfolk, by John Smith and Sons, Midland Clock Works, Derby, which is fitted with all the improvements introduced by this firm. It has one face 5ft. across, and strikes the hours.

The foundation-stone of a new Free Church at West Knockbain was laid on Friday. The church, which will be seated for 500 persons, is designed in the Early English style, and is expected to cost £1,200.

The Dean of Westminster writes to inform American visitors to the Abbey that the monument to Viscount Howe, "slain on the march to Ticonderaga" in 1758, which was erected by a vote of the Province of Massachusetts in the year following, has been removed from the window in the south aisle of the nave, where its inscription was to most eyes undecipherable, and placed on the floor, immediately behind the monument to Fox and just within the belfry.

### MEETINGS FOR THE ENSUING WEEK

**SATURDAY (TO-MORROW).**—Architectural Association. Visit to Layer Marney. Train from Liverpool-street station, 8.50 a.m. Municipal Surveyors' Association. T. by steamboat from Temple Pier 11a, to inspect the Tower Bridge and n. Outfall Works at Barking. **WEDNESDAY.**—Cyprus Exploration Fund. Public meeting in rooms of Society of Antiquaries, Burlington House. Paper on "Excavation of the Temple of Aphrodite at Paphos," by E. Gardner. **THURSDAY.**—Society of Architects. Visit to the London and South-west Subway, 1 p.m. **SATURDAY.**—Glasgow Architectural Association. Afternoon Visit to Bothwell and Neighbourhood.

The memorial to the late Colonel King-Harmer, the first Parliamentary representative of the Isle of Thanet, will take the shape of a statue, the times life-size, to be erected in a prominent position in Margate.

Princess Beatrice laid on Tuesday the memorial stone of new almshouses at Greenwich. They will replace a group of buildings built in 1809 to commemorate the jubilee of George III., and are erected from plans by Mr. T. W. Dinwiddie.

At the last meeting of the Pudsey local board Mr. Nelson, Leeds and Fulneck, was appointed architect for the proposed public park Church-lane, and instructed to prepare plans of lodge and boundary-walls.

**Holloway's Pills.**—The Great Need.—The blood is the life, and on its purity depends our health. These Pills thoroughly cleanse this vital fluid from all contaminations, and that power strengthen and invigorate the whole system, health stimulate sluggish organs, and establish order of circulation a secretion throughout every part of the body.

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### TENDERS.

\*.\* Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, if accepted tender: it adds to the value of the information.

**BANGOR CITY.**—For flooring the schools now in course of erection at Glanadad with wood blocks, for the Bangor School Board:—**Elliott, Edmondson, and Olney**, Manchester, 5s. 6d. per yard (Accepted.)

**BOURNEMOUTH.**—For additions to the Herbert Colvaescent Home. **Mr. H. E. Hawker**, Bournemouth, architect:—

Jones ... .. £1,160 0 0

MacWilliam ... .. 1,145 0 0

Jenkins ... .. 1,095 0 0

George and Harding (accepted) ... .. 982 0 0

**BOURNEMOUTH.**—For additions to the Osborne. **Mr. H. E. Hawker**, architect:—

Jenkins and Son (accepted) ... .. £375 0 0

**BROOK GREEN.**—For block of residential flats at Herlem-road, W. Messrs. **Lewen Sharp and Arple**, 3, Dul street, Adelphi, W.C., architects:—

Patman and Fotheringham ... .. £3,494 0 0

Leslie and Knight, Kensington, ... .. 3,400 0 0

\* Accepted.



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

VOL. LV.—No. 1749.

FRIDAY, JULY 13, 1888.

### CHARGES OF NEGLIGENCE.

A GENERAL impression prevails amongst many practical-minded people that an architect cannot charge anything for preparing plans or estimates for a work that turns out of little practical use, or which has cost more to carry out than is anticipated. Why such an idea should be entertained we cannot imagine, unless it is that the profession have themselves fostered the notion that they are paid for designs on paper, so much actual office labour of a mechanical kind, instead of for their artistic advice and ability in carrying out buildings. The art and scientific knowledge possessed by the architect count for nothing if a flue fails to draw, a kitchener does not cook well, or a drain becomes stopped up. These little defects, mechanical as they are, very seriously discount the value of the architect's services. Unfortunately, too, they are often found to exist in a somewhat unaccountable direct ratio to the external architectural success of the building: in other words, the plain and ugly building is generally the most faultless in internal arrangements of this description; the inference is thereby drawn that architects look after the appearance and increase cost without insuring direct advantages. No doubt there has been some ground for notions of this kind; but are there not other advantages secured by the employment of a professional adviser and supervisor? Is the house not better built, better planned, and the expenditure laid out to better advantage? We appeal to the experience of those who have built. There will always be people who affect to undervalue architects' work, as they prefer to be thought their own lawyers and doctors. No immediate benefits may accrue from an architect's skill; often his art and science are "unknown quantities"; but they are nevertheless appreciated by people of taste and judgment.

Negligence and want of skill are often pleaded by clients and committees without so much as a shadow of reason. What constitutes negligence and want of skill? This is a poser to the employer. It may be considered negligence on the part of an architect if, through not having examined every part of a foundation, a portion of it gives way; if bad materials are introduced in his absence; if a skating-rink floor sinks in parts, and it cannot be used. Nevertheless, these are matters which so essentially belong to the builder's duties that it would not be easy to say which of the two is liable. As the duties of the architect are now performed, it would be quite impossible for him to superintend those things in every work in which he was engaged; the legal decisions that have been given impose only a general superintendence of the work. It has been also ruled that the highest skill cannot be demanded, only that ordinary degree of skill and knowledge which is reasonably expected from an architect. There is one test which the law appears to have laid down touching the architect's claim to recover payment. The work done must be of some use or benefit to the employer. If he derives no benefit from the work, the architect cannot recover his charges. Let us suppose a house incomplete by reason of some alleged fault in its design. One thing by which we may know whether the employer derives any benefit from it is occupation. If he goes and lives in the house, notwithstanding its alleged im-

perfection, it may be concluded that the owner can make use of it, and therefore he has received some value. Were it otherwise, any employer could turn round and say, "The building is not what I wanted; I cannot think of paying you for your services." We all know the dissatisfaction of some employers—nothing pleases them after the accounts are delivered. To the jury is generally left the question what is a "reasonable degree of care and skill." How very differently must these terms be construed! An ordinary degree of care must be relative. To a busy or eminent architect it may mean a glance once a month; to a small country practitioner a daily inspection; so of skill—it may mean very different things in the minds of differently-constituted juries.

As to want of skill, we may take one of the everyday cases where an architect's knowledge is called into requisition. A manufacturer or tradesman engages an architect to prepare plans for business premises. Plans are accordingly prepared, but in ignorance of the rights of the client's adjoining neighbours as to light. The building is finished, but the neighbour complains of the loss of light which he has suffered, a right of light that has been enjoyed over the prescriptive period. An action for damages is sustained, and the building owner becomes liable for damages—is the architect to be held responsible? The question has not yet been satisfactorily settled. Is the ordinary skill which the architect is supposed to bring to his duties to include a knowledge of law as applied to easements? In these days of advanced knowledge it may be presumed that it does. An architect who does not know the easements of light and support cannot safely be entrusted with the planning of buildings for business purposes in a crowded site. But it has been assumed that an architect is not supposed to be acquainted with the private rights of his clients or his neighbours, and, therefore, if an owner becomes liable, he would not have any remedy against the architect in the usual course. We are doubtful if any jury would now be disposed to act upon this opinion. No doubt it is the business of an intelligent employer to instruct his architect about these rights, which he cannot in all cases be supposed to know; nevertheless, the duty of a responsible professional adviser is to satisfy himself as regards these rights, and to advise his client upon them. Instructions to prepare plans convey the power to make inquiries, and to exercise one's judgment: a very different meaning would attach to a commission to an architect to prepare a design from verbal instructions only. Any error committed would in this instance clearly be the fault of the employer, and it should be the architect's duty to make the designs subject to the owner's taking any liability as to instructions that were given him.

Of course, parties can contract in any manner they desire. If an owner desires to make the architect liable for, say, omission or want of skill, he can do so, providing the architect is a consenting party; but we are now speaking of the ordinary course, in which no special obligations are undertaken by the architect.

A legal tribunal would hold an architect liable for any ignorance or carelessness by which his client suffers, the damages recoverable being the loss or damage that has been sustained. An owner would, for instance, have a remedy against the architect for any failure—such as a roof giving way, or a column breaking owing to unskilful design—where the failure can be plainly traced to insufficient scantlings or bad construction; but if there is no apparent defect in the design, the failure having occurred through unskilful workmanship or materials, over which the architect could not be supposed to exercise constant control, the contractor

is certainly the liable party. In France and other countries the question of negligence has been more clearly defined. The architect is held responsible for not watching over the work, for allowing a defective foundation, or permitting the use of improper or insufficient materials, or for neglecting to observe the laws and regulations, or servitudes and agreements, connected with building and client; but the consequences fall only on him when the client has suffered damage. Both architect and contractor are held liable for unskilfully-directed and badly-executed works. We are not treating here of the responsibility of the architect, but of his right to payment when a charge of negligence has been made against him. The making of estimates is attended with this risk. An estimate is prepared for a building which is found considerably below the real cost owing to some omission on the part of the architect; the owner refuses to pay, and it is very doubtful if the former can recover anything for the plans. Such a case is of frequent occurrence; an engineer employed to erect a bridge makes an estimate of the cost, which is found incorrect by a large amount: he has not examined the substratum, and his estimate is therefore of little value. But in all such cases it is the duty of the jury to inquire into the circumstances of the work, and if there are found to be difficulties in the way of obtaining a correct estimate, the architect should not be made responsible for the loss.

### WHAT IS A LEASE?

THIS question—What is a lease?—has been asked in hundreds of cases in the courts of law, and it has been answered in many various conflicting and confusing ways. It has generally arisen upon the point whether or not an agreement for a lease did not, in law or in equity, come to the same thing as a lease itself. The broad result of the authorities is that if such an agreement contains words of present demise—that is to say, if the landlord thereby lets, and the tenant takes, the premises mentioned, it must be regarded as a lease for all practical purposes—premising, of course, that it is acted upon by the parties. The Courts of Equity have always been ready to prevent any injustice following from the refusal of a lessor to grant a proper legal lease as he had promised, by ordering specific performance of such an agreement. A new point of much importance upon this question of what is a lease has, however, lately been raised upon the consideration of Section 14 of the Conveyancing and Law of Property Act, 1881. This excellent statute was passed to soften the hardships of the law of landlord and tenant to some extent, and it did a little towards civilising the barbarous system which we have inherited from our ancestors. In the section named it was provided that a right of re-entry or forfeiture under any stipulation in the lease, for breach of any covenant of the lease, shall not be enforceable unless and until the lessor serves upon the lessee a notice specifying the particular breach complained of, requiring the lessee to remedy the breach, if that can be done, or, if not, to make compensation, and the lessee fails within a reasonable time thereafter to remedy the breach or make such compensation. This fair and equitable provision applies to every lease, whether made before or after the Act of 1881, and notwithstanding any stipulation to the contrary. But does the word "lease" we have used include an agreement for a lease which has been acted upon by the parties as if it were an actual lease, and which is enforceable as such accordingly? This was the question raised in the recent case of "Swain v. Ayres and Luck" (*Times*, 13th June), and decided by the Court of Appeal, confirming the Court below in the negative for reasons of a highly tech-



nical, narrow-minded, and, as we consider, of a most unsatisfactory character.

As long ago as July, 1853, the present plaintiff's predecessor in title entered into an agreement with the defendant's predecessor for a lease for eighty years, upon condition that the tenant would lay out £100 upon repairs, and should then be entitled to the lease, and, in the mean time, should hold the premises subject to the usual lessee's covenants to repair, with powers of re-entry and forfeiture upon default. No lease was ever granted, although the tenant did the repairs as arranged, and could, had he chosen, have obtained a lease by means of a decree for specific performance if necessary. This was not done, and the tenant went on paying rent, and holding, under the agreement, down to 1886. Then the plaintiff brought the present action to recover possession of the premises, and claiming a forfeiture on the ground that the defendants had broken their covenant to repair, as the premises were in a very bad state of repair. The defendants' main answer was that they were entitled to the protection provided by Sec. 14 of the Act of 1881, and that, therefore, the plaintiff should first have given them notice of the bad state of repair, and calling upon them to remedy the breach of covenant by putting the premises into proper repair, before he could bring an action upon the forfeiture. Obviously, this argument was based upon the contention that the word "lease" in this section included an agreement for a lease, which in this case had been acted upon by both parties as a lease for 33 years. Mr. Justice Charles, who heard the case in the Queen's Bench Division, decided in favour of a narrow construction of the word "lease" as used in the section quoted, giving it what he called its "natural meaning," as if that had not been lost long ago amongst the definitions of learned lawyers. He held that it was not a lease, but an agreement for a lease, although it contained words of present demise. He admitted that Sir George Jessel—who was, we consider, one of the ablest and most large-minded judges that ever lived—had practically ruled in a leading case that a person who held under an agreement for a lease was in the same position as one who held under an actual lease. But he "distinguished" the cases, and found the facts different, as they always are, and he finally gave judgment for the plaintiff, holding that, though this agreement was a lease from the lessor's point of view, and so appreciable as such, it was not a lease within the meaning of section 14 of the Act of 1881, so as to give the lessee or tenant any protection from the forfeiture incurred.

We regret to say the Court of Appeal took the same narrow view of the question. They held that as the defendants had let the premises fall into a bad state of repair they could not, after doing this, obtain a decree of specific performance of the agreement for a lease, and so obtain the actual lease itself. From that they argued backwards that this agreement for a lease was not therefore the same thing as a lease, although in a general way it would be so considered. Going along the same line back, they held that as the agreement for a lease was not now the equivalent of a lease, it was merely a tenancy, and could not come within the meaning of the clause quoted. This appears to us to be the very perversion of all just and judicial reasoning. It could not be disputed that the tenant could have compelled his landlord to grant him a lease at any time after he had done the repairs as stipulated, and before he broke the covenant to keep the place in repair. Therefore, during the whole of this period the agreement for a lease was admittedly as legally binding as an actual lease. Yet when its effect comes to be considered, although the agreement is held enforceable as a lease by the lessors, it is to be

regarded merely as a tenancy in respect of the lessees, because they have broken a covenant and incurred that forfeiture from which the Act of 1881 was expressly intended to protect all those who held under what is in law or equity a lease! It is certainly very unwise for parties to an agreement of this kind not to take up a proper lease because of its cost, and so make sure of their legal position; and the heavy loss that will be suffered by the defendants in this case may be a warning to others similarly situated. It is equally foolish for tenants or lessees who are bound to repair to let the premises fall into so bad a state by putting off the evil day of expenditure as long as possible. But, apart from all this, we cannot accept the decision of the Court of Appeal as in accordance with the scope and spirit of the Act of 1881, or with the broad and enlightened views laid down by Sir George Jessel from that Bench. We maintain that the question whether this agreement for a lease amounted to a lease within the meaning of the section, should have been considered with reference to the position of the parties under that agreement before there was any breach of covenant, and not afterwards. It is obvious that had this been done, the defendants would have succeeded, and the object of the Act of 1881, in affording relief to lessees, would have been obtained.

#### PRACTICAL ARCHITECTURE, WITH DETAILED ESTIMATES.

By H. LOVEGROVE, F.S.I., Surveyor.

##### INTRODUCTORY.

THE subject of quantity taking has been treated of by several writers. Many books on building generally have sections treating on the subject; but, for the most part, these are mixed up with a variety of other and widely different matter.

Many years since a book called the "Young Surveyor's Preceptor" was published, and later on the articles in this journal, by Mr. Banister Fletcher, which subsequently formed one of a series of volumes on practical surveying.

"Quantity Surveying," by Mr. Leaning, appeared in 1880, a very able work, dealing especially with method, and endeavouring to set forth the best system of preparing quantities, apparently based on the orderly procedure of a much respected member of the profession, Mr. Thomas M. Rickman.

All the above mentioned works take a small portion of a building so as to illustrate the method of taking a typical item in each trade, and laying down rules for abstracting and billing, according to the accepted methods.

Blenkarn's "Specifications" was for many years the only treatise on the subject until the publication of the "Handbook of Specifications" by the amiable and erudite Professor Donaldson, who gave to the world not only his own practical and well-written specifications, but also a large number of typical specifications for important public buildings by some of the leading architects of his time. Later, Mr. F. Rogers published a work based upon Blenkarn's, and including some portions of that work, with more modern specifications, chiefly of ecclesiastical architecture.

The present series was suggested by readers of this journal, and no apology should be needed for my attempt to comply with the request of the Editor to endeavour to lay before the architectural student one method of writing specifications and preparing bills of quantities, with the advantage of first-rate illustrations of comparatively small but complete buildings, adapted for every-day use and ordinary requirements, with details of their construction.

The object of these articles is not to add to the already excessive number of quantity surveyors, but rather to induce architectural students to study details of practical building and the measurement thereof, believing as I do that such knowledge will in the future prove quite as useful as entire devotion to drawing and drawing only.

I have not one word to say against draughtsmanship, as unquestionably good and correct drawings produce good buildings.

It has been my lot to take off from drawings of all degrees of quality, and I confidently affirm that some of the best drawings not only correctly illustrate the intention of the author, but at the same time are thoroughly practical.

Architects fifty years since did not consider it derogatory to master and, if necessary, to practise, the art of measurement of artificers' work; and I have always failed to understand why those members of the profession who have taken up that branch should be locked down upon by some artistic practitioners, while others, whose architectural practice has been more or less confined to the laying out of estates and other branches of surveying, have been treated otherwise, although their art consists chiefly in a superficial smattering of the leading art topics.

The architect of the future must be an all-round man, able to design with correct taste, to manage the business of his calling in a business-like way, to protect his client's interest by his practical knowledge, to be able to direct the decoration, and last, but not least, to prove to the world that his scientific knowledge of such matters as ventilation and drainage is at least equal to the best specialist, and superior to the advertising and often ignorant pretenders.

I will not pretend that there is no better way of doing any portion of the work than that given in the following articles; but students may learn much from them, and more experienced students be led to consider the subjects treated, and so develop their own ideas for the benefit of younger men.

##### DESCRIPTION OF THE HOUSE.

The building selected for our first subject is a middle-class house containing ample accommodation for a family of average size, as follows, and the building forms one of a series, the designs of which were executed for an estate at Hampstead a short time since:—

*Basement.*—Breakfast-room, larder, pantry, kitchen, scullery, and the various offices adjoining.

*Ground Floor.*—Drawing and dining-rooms, library, cloak-room, with w.c. and conservatory.

*First Floor.*—Five bedrooms, bath-room, housemaid's lobby, and w.c.

*Second Floor.*—Three bedrooms and cistern room.

The level of site, as will be seen by the drawings, is much lower than the adjoining roads.

The drawings will fully illustrate the arrangements of the building and the details of its construction, while the specification will describe the materials in each trade, the construction and fittings being rather superior to the work of a speculative builder for a house of the class.

**SPECIFICATION** of the works to be performed in erecting and completing a detached residence in ——— road, Hampstead, in the County of Middlesex, according to the drawings No. 1 to —, and such other explanatory and detail drawings as may be supplied from time to time, and under the superintendence of the architect.

##### PRELIMINARY.

1. *Notices.*—Give notice to the District Surveyor of East Hampstead, and pay his fees. Give notice to the surveyor of the Hampstead Vestry, deposit plan of drains, and pay the fees for connection with sewer.
2. *Hoarding.*—Obtain a license from the Hampstead Vestry, pay the fees, and erect a suitable hoarding with gates.
3. *Water.*—Provide water for the use of the works.
4. *Insurance.*—Insure the building for the full amount of the contract in the joint names of the employer and contractor, in an office approved by the architect, and deposit the policy with him.
5. *Attendance.*—Attend upon, cut away for, and make good after all trades, in all trades, including gas-fitter.
6. *Rubbish.*—Remove all rubbish from time to time and at completion, and leave the whole of the building clean, perfect, and fit for occupation.



# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1750.

FRIDAY, JULY 20, 1888.

## CONTRACTS WITH LOCAL AUTHORITIES.

THE numerous local authorities about the country are the creations of a complicated series of statutes which refer to and run into each other in a most remarkable manner. It is this confusing method of legislation that is continually leading to litigation, and constantly giving our Courts troublesome work to do at the expense of the ratepayers, or at the cost of some unlucky contractor or surveyor, who has lost his way amongst the mazes of the many Acts of Parliament with which the doings of local authorities are surrounded. It is well for those who have any transactions with guardians of the poor, sanitary boards, and the like, to know something of the principles of the law, at all events, by which these bodies are regulated. The over-lapping of the various new jurisdictions conferred upon the old corporations have led to strange results, and to the raising of many natty points about the meaning of the legislature. The recent case of "Dearle v. the Guardians of the Petersfield Union" (*Times*, 6th June), in the Court of Appeal, is an excellent example of what we mean, and it may also be taken as a useful warning to all who have dealings with local bodies. It was an action by a contractor against the defendants, acting as the rural sanitary authority, to recover certain sums of money alleged to be due to the plaintiffs, under an agreement relating to the construction of sewers. There was no question as to the orders having been given, the agreement made, and the work done, although the amount due was a matter of the decision of an arbitrator to whom it had been referred. But the defendants took preliminary objection that the claim was barred by a special statute of limitations passed for the protection of poor-law guardians. This Act is the well-known 22nd and 23rd Vict. c. 49, which, in Section 1, declares that all debts incurred by the guardians of any union shall be paid within the half-year in which the same shall have been incurred or shall become due, or within three months afterwards, from the expiration of such half-year. The action was brought in May, 1887, and the work charged for was one during 1885 and 1886. The half-year for poor-law guardians ends on 25th March and 9th September in each year, so that if this action was applicable to the present claim, it would be too late, and the debt would have been barred.

But then it was clear that the clause we have quoted only affected poor-law guardians as such, and had nothing to do with sanitary boards. When the Act was passed in 1859 these guardians had no duties whatever in regard to sanitation, and the limitation of actions given thereby was to protect them in their capacity as poor-law guardians, which was then their sole reason for existence. When, however, the Public Health Act of 1875 was framed, it was provided, in order to cover country places, that the area of a union, not within an urban district, should be made a rural district, and the guardians of the union were constituted the local authority over such rural district for the purpose of carrying into effect the sanitary provisions of the statute.

In accordance with the usual slipshod manner in which even our most important acts are drafted, a general clause was inserted in the Public Health Act, 1875, at the end of the section creating this rural

authority, declaring that "all statutes, orders, and legal provisions applicable to any board of guardians shall apply to them in their capacity of rural authority under this Act for the purposes of this Act." The point now raised by the defendants was that this sweeping proviso dragged in the limitations given by the statute of 1859 as to claims against poor-law guardians, and applied that limitation to all claims against these guardians, even in their new and entirely different and distinct capacity of rural sanitary authority under the Public Health Act 1875. It is needless to dwell upon the shabbiness of this defence, for it is well known that corporations have no conscience, and it may be said that the guardians were bound to dig out this merely technical point of law, and raise it as a solemn legal argument on behalf of their unlucky ratepayers. At all events the plan failed, and the Queen's Bench Division held the defence bad. This might, and should have been, enough for the guardians; but we know well the love of litigation that is fostered by fighting with other people's money, and doubtless those lawyers who advised this rural authority thought it a very pretty point indeed, and so recommended an appeal. This, however, was equally unsuccessful, and now the ratepayers have nothing more to do but note the decision and pay the little bill.

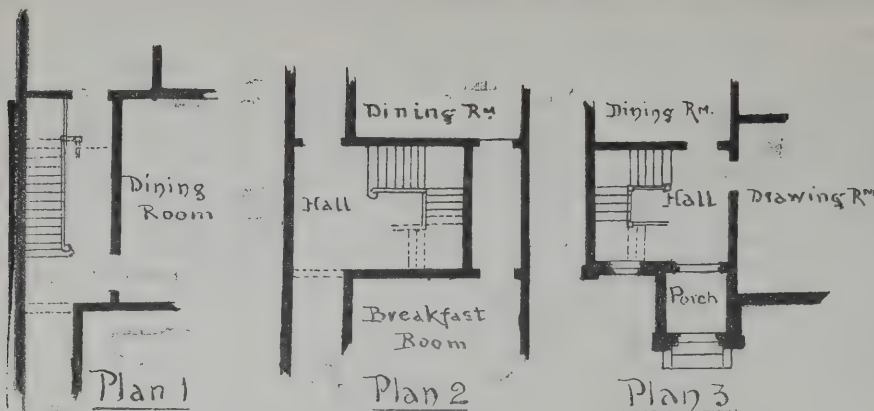
The judgment delivered by Lord Justice Lindley is marked by all that strong sense and sound law which distinguish this learned judge. As he pointed out, it was plain that the intention of the Act of 1859, which we have quoted, was to limit the period of bringing actions against guardians of the poor for acts done by them in that capacity. While the guardians were confined to contracts affecting the wants of their union in this regard, such a limitation was doubtless wise and desirable; but at that time the guardians had no powers as to the promotion of the public health, and probably no one had ever thought of intrusting them with the enforcement of sanitary duties. They were not enabled, under the Act of 1859, to enter into any contract for the construction of sewers or to incur debts for any similar objects. As far as logic went, it was clear enough that the Act of 1875 did not mean, and could not have meant, to drag in this limitation of actions and apply it to guardians in their new capacity of sanitary authorities; but in law the sweeping words we have noted had to be got rid of and explained. The defendants urged that this comprehensive clause brought in everything from the earlier Act of 1859 affecting guardians of the poor, and applied it all to the same guardians as a rural board, including, of course, the fixed periods of limitation. The Court of Appeal, however, were fortunately equal to the task of untying this knot and of preventing injustice from being done by a bungle of legislation. They held, with much subtlety, that the clause in the Act of 1875 did not extend the provisions of the Act of 1859, affecting guardians of the poor, to all acts which a sanitary authority might do; but it only extended those provisions to a sanitary authority when they were exercising the powers of the guardians of the poor. The contract in question being for the making of sewers, was obviously one which a sanitary authority had power to enter into, but which guardians of the poor, in their capacity as such, could not have made. "All's well that ends well," and so the contractor will get his money, while a case has been decided for future use and a precedent set up, at the expense of the unmindful ratepayers of Petersfield. But the moral is that it is a bad plan to give long credit to any corporations, and also that the various capacities in which local authorities act under different statutes needs to be heedfully borne in mind and well distinguished.

## HALLS AND STAIRCASES.—I.

NO other part of the interior planning of buildings reveals the architect's skill to so large a degree as the hall and staircase, although it is one of the most neglected portions of ordinary houses. In the common type of street dwelling the passage answers the purpose of the hall, and along one side of it a ladder-like flight ascends to the landing and thence to the first-floor level, the same staircase being repeated to the second, third, and fourth floors; these stair-flights, which face the front door, are neither easy nor inviting: in the smaller tenements, they are "break-neck" arrangements, too narrow for two to pass comfortably; in other cases they are dark and dingy, thrust out of sight as much as possible, as if they were evils to be avoided. The cramped, "steep riser" stairs is one of the inventions of quite recent times in towns, two houses being built where only one ought to stand. In the country the old spacious hall and staircase are yet to be seen in the residences not only of the gentry but the agriculturists. Numerous old farm and manor houses show the hospitable hall, the short, easy flights of balustraded stairs with square landings, and sometimes the old screens and galleries. The antique carvings and carved-oak newel staircase still survive to tell their tale of festal receptions. These arrangements are only the survivals of the still more lavish hall of feudal times, and of the later Tudor period. The memory reverts to the old English hostel, such as the "Tabard," described by Chaucer in the "Canterbury Tales." We can trace back still further when the Norman hall was the chief apartment, in which the king or lord of the manor administered justice, gave audiences, and entertained guests. Such were the halls at Mayfield, Sussex; Penshurst Place, Kent; Eltham, Westminster, Crosby, and other noble examples with their open-timber roofs. The entrance screened off at one end, with a gallery above; the raised dais at the other end, at which the host and superior guests sat; the open hearth and louvre for escape of smoke; the large bay windows are still seen in the University halls. And there is direct evidence that the atrium of the old Roman house, open to the air, with its surrounding colonnade or verandah, was the germ of the hall of the Tudors. After this epoch the hall lost its significance as a chief apartment; the domestic offices and private reception-rooms became more numerous as the habits of civilised life became more pronounced, and private apartments gradually encroached on the space formerly appropriated to the central hall. This tendency has gone on increasing to our own day, when the private apartments are now regarded as the principal portion of the house. Less and less space was given to the hall, till we find the hall and stairs dwindled down to the insignificant proportions they assume in the modern middle-class house. It cannot be denied we have sacrificed much of the dignity and importance of the interior in giving the hall and staircase so scanty a portion.

There are many varieties of halls and staircases to be found in the United Kingdom. Somewhere in his instructive work on "Baronial Architecture" Mr. R. W. Billings describes the singularity and beauty of the Aberdeenshire castles and houses. These are generally circular in plan, and some of them are very wide and elaborate in design. One at Fyvie is pointed to as the largest circular staircase in Britain—a coach-and-four might be driven up it; the steps, instead of being in single stones, being carried by a series of triangular vaultings. The staircase at Glamis has a hollow newel the whole height; at every floor there is a doorway. Its original purpose was for drawing up water to the different stories—a use which may be taken to be the germ of the modern lift, which sometimes occupies this position.





One notable modern instance are the staircases to the Law Courts, London, where the hollow newel is pierced, forming a very charming centre feature. In other parts, as Forfarshire, the plans of staircases are generally parallelograms.

Italy is, however, *par excellence*, the land of palatial staircases and halls—a development of the subject into which we do not here propose to enter.

Practical, rather than architectural, considerations have been mainly dealt with in treating of these portions of the interior of our houses: for some unaccountable reason, there have been few attempts to make the hall and staircase the centre of architectural contrivance and art, such as they were during all the great evolutionary periods of architecture, and the subject has been looked upon as a sort of *bête noir* by many of the profession.

Halls and staircases may be divided into three well-known arrangements: I.—(1) have halls in front; (2) at the side; (3) in the centre. II.—(1) staircases in halls; (2) lateral to halls. We intend to speak of these arrangements, beginning with the smaller and simpler types of staircase-halls we find in ordinary dwellings, and by a “staircase-hall” we designate a hall occupied by stairs.

Three very common plans are to be noticed in town dwellings (see sketches Nos. 1, 2, and 3). The first and commonest class is the entrance and staircase on one side, the latter in front of the entrance. The advantages of this favourite builder's arrangement are obvious. The whole depth of the house can be utilised; a showy staircase, tolerably well lighted, is obtained. On the other hand, there are disadvantages. The stairs are exposed to the view of every visitor who enters the hall or stands within the threshold, and therefore, privacy is sacrificed; it is a somewhat draughty and uncomfortable plan; the back passage is often dark, if there is a projecting range of offices in the rear. No. 2 plan: the stairs are in a central position between the two rooms, far more desirable as an architectural arrangement and more private, but not so easily lighted as in the first case, unless by a large skylight at the top of the house. By a lobby entrance and a glazed door shutting off the hall from the back part of house, considerable comfort in winter time can be enjoyed. A very economical mode of placing the stairs in a house with a good frontage, or semi-detached, is shown in plan 3, especially when there is room for a spacious porch in front. The advantage of this position for the staircase is that good light can be obtained in front or at the side, and a spacious yet compact hall formed, from which the reception rooms are easily entered. It is not, however, quite so private as No. 2 arrangement, unless a large porch or outer hall can be attached to it. There is one way of obtaining light to a staircase hall, planned as in No. 2, when the house adjoins another—namely, to bring in the wall at the back of stairs, and make a

small area of the whole width of staircase. Windows may then be introduced into this wall which can be filled with ground or painted glass. The introduction of open areas for light affords the means of placing staircases in the centre of a building; they are otherwise restricted to outer walls and angles. When the houses are semi-detached or isolated, the recess for light would, of course, not be needed. There are many convenient and architectural arrangements of this type to be found in well-planned villas, where a side projecting porch or entrance, set back from the main front of house, introduces the visitor into a transverse hall with staircase at one end. A few suggestive plans of this sort we shall illustrate as we proceed, confining the reader's attention, first, to the staircase hall, as the simplest arrangement for small middle-class dwellings; and, in the next place, entering upon the arrangement in which the staircase is separated from the hall, each being made a distinct feature of importance, as we find in the larger class of noblemen's and gentlemen's residences.

Before we enter further into the subject, we may devote the remainder of this introductory article to the consideration of some of the leading principles of staircase planning and construction. The precepts of the old masters are generally wise, though sometimes rather too empirical and arbitrary for modern requirements. That learned and talkative commentator, Vitruvius, curiously enough, says little about the staircase. Palladio, one of the Italian Revivalists, furnishes a few rules, and observes that stairs “will be perfect if they are spacious, light, and easy to ascend, appearing to invite people to mount.” He says they should never be narrower than 4ft. 6ft., so that two persons may pass each other; the steps not exceeding 6in. in height, nor their breadth less than a foot. He further alludes to the ancient practice of making the number of steps of an odd number, so that the same foot may be used in finishing as in beginning a flight, and eleven, or at most thirteen, steps are considered sufficient before reaching a landing. These and other rules, useful as they are, have to be altered to suit circumstances. It is not always possible to make a staircase 4ft. 6in. wide, to have steps of 6in. rise and a foot in tread, and to have an uneven number of steps to a flight. A right-hand handrail is no doubt an advantage, though it cannot always be arranged. The relation between rise and tread is of far more importance in determining an easy and convenient staircase. Blondel, in his “Cours d'Architecture,” has given a method that has been found to give favourable results. He assumes a distance of 24in. as being a convenient step upon level ground, and 12in. as a convenient height to rise, and this proportion gives an agreeable grade or ascent, for the difficulty of ascending a staircase is in proportion to the rise of each step. There is a certain relation of width of step to its height that ought to be observed—the greater

the rise, the less should be the width of step; in other words, the distance travelled at each step should vary as the grade, or inversely proportioned to the angle of ascent. A good proportion of step for a dwelling can be found by the following equations where  $r$  = the rise, and  $t$  the tread;  $r = \frac{1}{2}(24 - t) = 24 - 2r$ . From these rules it is found that if the height of step be 5in. the tread must be 14in.; if the rise is 6in., the tread must be 12in.; if the rise is 6½in., the tread must be 11in., and so on. The following table gives the higher risers usually met with in dwellings.

Rise.	Tread.
6.75	10.50
7	10
7.50	9
8	8
9	6

In designing plans of staircases, the foregoing rules are rarely followed; a certain run or length, and a given height, are predetermined by the plan of house, without any regard to easy grade. The length between the extreme risers is fixed, so is the total rise from floor to floor, and in this space the stairs are made to fit: the consequence is that the number of risers is more or less than desirable for an easy ascent. Thus between the extreme risers of a flight which is limited, a certain number of steps is divided out by the compasses, the width of each tread being a mere matter of convenience. Many of our staircases are spoiled by this rule-of-thumb setting out, just for the sake of saving a little labour in extending the staircase walls. A preferable method is to adopt a height of riser, and to find a width of tread by the second equation. Thus, if the distance between the extreme risers is not limited, and a riser of 7in. is fixed upon we have  $t = 24 - 2 \times 7 = 10$ in. as a tread that will insure an easy ascent. The mistake made by many architects is to leave the staircase to be adjusted after the other part of the plan are decided, instead of first deciding upon a grade of stairs suitable to the class of building. The subject of staircases also has been treated mainly from a constructional and technical point of view in which the various kinds of stairs made by joiners, handrailing, face-moulding, and other processes are described. The consequence has been that the young architect at the threshold of his studies has become disgusted with the technicalities of the craft, and has fallen back on his own resources. In the ordinary handbooks on the principles of handrailing not a word is vouchsafed upon the art of arranging or planning staircases architecturally, and the architect is therefore compelled to seek for precedents in other buildings or to copy arrangements that are defective or unsuitable to the purpose. In the following articles we intend to present a few typical arrangements, pointing out the merits and defects of ordinary plans—our object being to show that the hall and staircase should become the germ of the plan round which the rooms can be grouped, how very much of the comfort of a residence depends upon the location and arrangement of the hall and stairs, and how considerable and important a feature they are in the architectural arrangement of the design both internally and externally.

#### THE METROPOLITAN BOARD OF WORKS INQUIRY.

THE eighteenth sitting of the Royal Commission of Inquiry into the working of the Metropolitan Board of Works was held on Friday, Lord Herschell presiding.

Mr. George Brick, builder, recalled, said Mr. Sherwood and Mr. Coxhead were present at 35 Lisson-street when witness, Mr. Brown (the owner), and Mr. Thomas (of the Dangerous Structures Department) inspected the premises. Witness had visited the premises since the last



meeting of the Commission, and he was positive that the party wall complained of had not been taken down. The fissure which was discovered in 1884 was still there. Witness put his rule into seven places, and in one pushed it through to the extent of 20 in.

Mr. E. J. Sherwood, architect, said he accompanied the last witness to 35, Lisson-street in April, 1884. He remembered seeing there Mr. Brown, who introduced Mr. Thomas as "my friend." The inspection of the wall was made in witness's presence. They examined the front, and then proceeded to the first and second floors. Mr. Thomas walked up to the fissure, put his umbrella in it, and said that nothing need come down, adding that he was surprised that anyone should condemn the wall.

Mr. Frederick John Coxhead, builder, corroborated the evidence of the previous witness relative to viewing the premises, 35, Lisson-street on the occasion referred to, in the presence of Mr. Brown, Mr. Thomas, Mr. Brick, and Mr. Sherwood.

Mr. Thomas, recalled, said he never saw Mr. Sherwood or Mr. Coxhead on the premises. Mr. Sherwood he saw before the official referee; but until now he had never, to his knowledge, seen Mr. Coxhead in his life.

Sir Joseph Bazalgette, chief engineer of the Board of Works, recalled, gave further particulars with reference to the demolition of the old Battersea Bridge, and its reconstruction on the same site as the old one. He was also examined with reference to the purchase by the Board of some land adjoining the approach to Battersea Bridge for the purpose of widening the road. Mr. Furness, he said, was contractor for the Thames Embankment from Westminster to Waterloo bridges. The contractors for the part east were Mr. Webster and Mr. Richardson. A contract for the Thames Embankment north was let to Mr. Furness in October, 1863; another contract to Mr. Richardson in January, 1864; and a contract for the roadway on the Victoria Embankment was let to Mr. Webster in April, 1872. Mr. Webster had a contract in 1868 for a part of the Embankment. Lord Herschell.—At the time Mr. Furness's contract was accepted there was a lower tender?—Yes; there was one of £495,000 by Mr. Ridley, and Mr. Furness's was £520,000. Was Mr. Furness's the highest tender?—No. Several tenders were rejected, and witness recommended the Board to readvertise the contract; but, after consideration, they determined not to do so, and gave it to Mr. Furness. A question was raised with regard to you having yourself had some financial arrangement with Mr. Furness—not about this work?—That, really, was not a financial arrangement. Sir John Rennie obtained a concession for a contract in Odessa, which he had to carry out within a given time, but he had failed to get a contractor. He offered to part with the contract on condition of his having 5 per cent. for the concession. I was thus dealing with Sir John Rennie in reference to a contract in another country, having no reference whatever to my official position. I introduced Sir John Rennie to Mr. Furness, and he agreed to take the contract. An agreement was drawn afterwards that Mr. Furness should pay to him one half and one half to me. Had that been completed at the time of this tender of Mr. Furness's?—Early in 1862 Sir John Rennie proposed it to me. Mr. Furness's contract was in October, 1863. The Odessa matter was not over at that time. What was the amount of payment made by Furness to you under that arrangement?—Not a penny. I received no benefit whatever. When I found that it was thought that my having that connection with Mr. Furness might interfere with my official duties I relinquished all benefit in it. That was subsequent to Mr. Furness's contract?—Yes. What was the amount which you would have received, and which you relinquished?—I forget the amount; but it was a large sum. In carrying out of the contract by Mr. Furness did you permit any variations from the specifications as to the mode of filling in the reclaimed ground?—The ground was to have been filled in by dredging from the river; but the Conservators did not carry out the dredging as rapidly as our work required, and consequently we had to obtain ground from other places. Was that a benefit to the contractor?—I think so, but what I don't know. I had nothing to do with it. If there was a cheaper way of

doing the work, why was not the cheaper way specified?—It was a stipulation with the Board that we should take the ground from dredging in the Thames, the object being that it might improve the bed of the river without extra cost. Have you had any interest in any lands taken for the purpose of the Board's improvements?—I have had no interest in any land or property of any kind within the metropolitan area, with the exception of one house in the West-end of London, which was left to me by will. Where did the stone come from for the Thames Embankment?—The Dalbeattie and Scotch quarries. We found that we could not get it fast enough, and eventually had to obtain it from a number of different quarries. Neither I nor my family had any interest in any of those quarries. What are the more recent works which have been carried out by your department?—The largest at the present time in hand is the northern outfall precipitation works, the estimate for which is £406,000. We have let recently to Mr. Webster, jun., a contract for the southern outfall works at a cost of £259,000. We have in hand Battersea-bridge. We have just completed Putney and Hammursmith bridges, and we have a good many minor works. The witness explained the nature of the works to be carried out in connection with the subway at Greenwich. The work would cost something under 1½ millions.

Mr. Bosanquet: The largest contracts have been taken by Mr. Webster?—Yes. Was his the lowest tender always?—Most frequently; but sometimes there were lower. Inquiries were made as to the lowest, and when not accepted they were not considered satisfactory. Did you advertise for everybody to tender who liked, or did you take a selected class of persons?—We advertised for public tenders. How are they submitted?—They are opened by the chairman at the Board. Everybody is equally at liberty to tender for all contracts?—Yes. Mr. Studd: How much were you to have received on the Odessa contract?—I don't remember. Was an inquiry held into your conduct in the matter?—Yes. At a committee meeting of the whole Board?—Yes. With closed doors?—It was a committee meeting, and of course it would be with closed doors. Was a motion made by the chairman that the report should not be sent to the vestries, as is usual, but only to the members of the Board?—I don't know. Do you remember any members of the Board stating that had they known that you were engaged in the Odessa contract they would not have voted for Mr. Furness?—I don't remember. A lower tender was that of Mr. Baker?—Yes, he withdrew. Was it because there was no arbitration clause in the contract?—I believe it was. When there was no arbitration clause it meant that you would have a perfectly arbitrary power over the way in which the contract was carried out?—I would be the arbitrator, in fact; that has been so in all the Board's contracts. I suppose that if an arbitration clause had been inserted you would have got a great many more tenders?—I should think not. Is it not a fact that most of the best building firms will not tender when there is no arbitration clause?—No; we get tenders from the best firms. Contractors know my character pretty well, and know themselves whether I should deal with them fairly or not. Mr. Webster was the contractor for the southern low-level drainage works?—Yes. Did he use, in carrying out that contract, the bricks which should have been used in accordance with the specification?—I have no doubt he did. With regard to filling-in the reclaimed land on the Thames Embankment, the witness, in answer to Mr. Studd, repeated that the Conservators could not supply the sand fast enough to go on with the works, and delay was serious. Do you remember a statement being made in the committee that his not taking the sand would make a difference of £80,000 in favour of the contractor?—No. As to Battersea Bridge, was any compensation paid to anyone in connection with the alteration of the plans?—I know of none. Who received the largest compensation?—I don't know; I have nothing to do with compensation. After the second plans had been passed by Parliament, did you not alter them so as to include property which was not previously included?—I don't know what you mean. There is a property called Little Hell?—I don't recognise the name at all. By Mr.

White: I had nothing to do with the purchase or letting of property in any way.

Mr. Horace Grundy, district surveyor for Paddington, gave evidence as to a question which was discussed in 1875 relative to the erection of a furniture warehouse in Queen's-road, Bayswater, for Mr. Whiteley. The witness had reported to the superintending architect of the Board that the building did not comply with the regulations as to subdivisions. The matter was brought before the Building Committee of the Board, and it was suggested to witness by Mr. Vulliamy that it was not necessary to take proceedings. Lord Herschell: On the 8th of April I find you write to Mr. Vulliamy: "It has been suggested to me on behalf of Mr. Whiteley that, after reporting to the Board on the irregularity, it is not my duty to take proceedings without a further order."—Witness: I don't recollect that. That suggestion must have been from Mr. Whiteley's architect. Who was his architect?—Mr. Ebenezer Saunders. Mr. Chas. Roche was Mr. Whiteley's solicitor. He was also a member of the Metropolitan Board?—Yes. So far as I understand, the Building Act Committee decided in this particular case that a building used for storing furniture for the purpose of being sold by retail was not a building used either wholly or in part for the purposes of trade? I think the effect of the notice was that it was not for storing furniture, but for exposing it for sale. As a matter of fact, other people's furniture was stored there?—Just so. And the building was burnt down?—Yes.

At Tuesday's sitting Mr. Augustus Harris, lessee of Drury-lane Theatre, recalled, said, in reply to Lord Herschell, that he had seen a statement in the evidence of Mr. Hebb to the effect that the tickets for the theatre which that gentleman obtained had been asked for at witness's request. He had never requested Mr. Hebb to ask for any tickets, and the statement was absolutely false. The letters which had been published were the only communications which he had received from Mr. Hebb, and they spoke for themselves.

Mr. Hebb said it was quite true that he had had no communication with Mr. Harris personally. When he stated that he had been invited to write he intended to say it was at the suggestion of Mr. Harris's manager, who told him expressly that he would not admit him by what he called "face presentation." If he wished to go to the theatre, he was informed, he must write to Mr. Harris. By Lord Herschell: That was when you went avowedly for the purpose of inspection?—In the daytime I had no difficulty, but this was when I went in the evening. With a friend?—Yes. Then the manager told you that if you wanted to go to the theatre you must write?—Yes. Lord Herschell: That is hardly requesting you to write for tickets.

Mr. Harris: To call it a request is putting it in a false light. Refusing admission is hardly an invitation.

Lord Magheramorne, Chairman of the Metropolitan Board of Works, was the next witness. He said that he became a member of the Board in 1867, and had been chairman since 1870, when he succeeded Sir John Thwaites in that position. The office was a salaried one. Sir John Thwaites received £2,000 a year, and witness on his election £1,500, this being raised some years afterwards to £2,000. He presided at meetings of the Board and of the Works Committee, and attended other committees as an ordinary member. By Lord Herschell: The Board had a very large amount of property to deal with in the way of buying and selling?—Oh, yes. The Works Committee consists of all the members of the Board?—Yes, sixty members. And the attendance is often as numerous as fifty?—Very often. Does it strike you that that is hardly the kind of body suited to deal with the management of the sale of a large estate and all the details connected with it?—The officers report to the Works Committee. Does that not necessarily leave the matter in the hands of the officers?—I do not think so. They make their reports to the committee, these go before the solicitor, and I must say they receive the greatest possible attention. The result seems to show that the matter was in the hands of the officials of the Board, who did very much what they liked?—I do not think so. Were you under the impression at the time that people who sent in tenders were



tendering with any knowledge of what the architect's valuation was or what was likely to be accepted?—I had not the faintest idea that they could have any knowledge. I have absolutely refused to allow the architect's valuation to be divulged to anybody. Now it rather looks as if it were divulged to anybody?—I do not know. The result was that it was communicated to certain persons whose offers the Board believed to be an entirely independent valuation?—It is an unfortunate thing that there had been one or two rogues who have been found out, and I trust we have got no more. We have at present a different plan, and, as far as I can see, it is impossible for anyone to have the information excepting the architect. Had you at any time any suspicion of the action of Mr. Goddard?—Never. I was never more surprised in my life, and could not believe my ears when I heard the statements made against him. He was trusted entirely. I had not the faintest suspicion that he could do wrong. I looked upon him as an honest and straightforward man.—Were you aware that members of the Board who were practising as architects were doing work in connection with matters that came before the Board?—Once or twice I was told that Mr. Saunders had to do with one building and Mr. Fowler with another, but I did not know it until they were erected. Once a question came before the Board with reference to the Hotel Métropole, and Mr. Saunders told me that he was interested in it, and would take no part in its discussion. He left the room. Mr. Vulliamy, the superintendent architect, fell into ill-health a year before he died?—Yes. He retired on a pension of £1,020?—Yes. After that he returned and said he found he was fit for work?—The Board had tried to get a successor, and failed. It was a mutual accommodation that he should return and do the work until a successor could be found. Was he not paid until the time of his death the usual salary and his pension as well?—He was. Why was that?—I presume the reason was that the majority of my colleagues thought they would have had to pay some one the salary and Mr. Vulliamy his pension at the same time. But it is strange that services which were only worth £1,750 when he was in full health should be worth £2,770 when he was in ill health?—Quite so. Questioned as to Mr. Hebb's applications for theatre tickets, witness said the matter was brought to his attention two years ago on a complaint by the manager of the St. James's Theatre. He told Mr. Hebb that his conduct was most reprehensible; but, believing the application to be an isolated case, he did not bring the subject before the Board. Did you make any inquiry as to whether he had asked for tickets elsewhere?—It never crossed my mind that he could do such a thing. (Laughter.) If the correspondence with Mr. Harris had been brought to my knowledge, I should have called the attention of my colleagues to it at once. By Lord Herschell: Has the balance kept at the London and Westminster Bank been increased?—No, decreased. We buy Treasury Bills if the balance at the bank is above £250,000. By Mr. Winch: The Board of Works had never kept an account at the Bank of England to witness's knowledge. The money for the coal and wine dues was paid into that bank and then transferred to the London and Westminster. All the Board's loans were brought out by the Bank of England. With regard to this land jobbing, was any suggestion made to you that it was being carried on by Mr. Robertson, or Mr. Goddard, or any one else?—No.

Mr. Thomas G. Fardell, a member of the Metropolitan Board, said he had strongly but unsuccessfully advocated the submission of the London Pavilion site to public competition, because it was one of the finest sites in London, and he did not think a music-hall suitable for such a position. He did not know at that time that Mr. Robertson, Mr. Goddard, and Mr. Villiers were mixed up in that transaction. He was a member of the committee which inquired into Mr. Robertson's conduct. Two or three days before the final report was presented he received a letter from a gentleman who had seen Mr. Robertson, expressing a hope that if he thought there was no ground for the allegations he would endeavour so to frame the report as to acquit Mr. Robertson of any wrong intentions. To the report, which partly excul-

pated and partly censured Mr. Robertson, an amendment was moved to dismiss that gentleman. This was lost by 19 to 26, witness voting in the minority. On July 29, 1887, he moved to invite the Government to appoint a Royal commission and was defeated by one vote. Mr. Saunders on that occasion voted in the majority. (Laughter.) He could not say whether Mr. Fowler voted, but that gentleman moved the adjournment of the Board before the motion was taken.

Mr. H. Bennett, assistant engineer, and Mr. John Gooding, who was employed under Mr. E. Bazalgette, assistant engineer at Battersea Bridge, stated that the bricks used in the works under their supervision were in accordance with the specifications. Bricks had been sent to the Battersea Bridge of inferior quality, but these were not allowed to be made use of. The witnesses declared that they had received no payment or consideration from any contractor. The inquiry was adjourned to Tuesday next.

## STRAINS.—II.

By G. A. T. MIDDLETON.

### SHEARING STRESSES IN CANTILEVERS AND BEAMS

THE opposition of the two forces spoken of in the last chapter—the load borne by a beam or cantilever, and the reaction of the supports—causes in the beam a strain similar to that caused in a piece of thread when exposed to the cutting edges of a pair of scissors, which strain is known as "shearing." Scissors, however, are made sufficiently powerful to overcome the resistance which thread makes to being shorn, while beams have to be designed to contain sufficient material in their webs (if they be of the flanged type) to resist the shearing effect of the load and reaction.

In the case of a cantilever carrying an end load (Fig. 8), the reaction  $R$  and the load  $W$  are

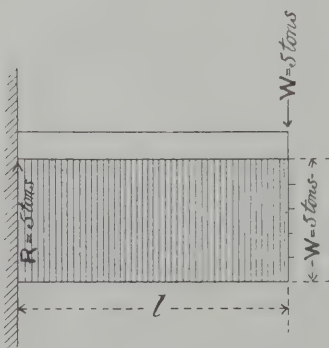


Fig. 8.

equal to one another; but their lines of action, though parallel, are opposite in direction. From this it follows that the member which enables these two forces to oppose one another, and so to produce equilibrium, is subject at each point throughout its entire length to a shearing strain equal to either one of them—not to the sum of the two, for where two equal opposing forces of any kind meet, the strain produced is the measure of one of these forces only, because there could be no strain at all unless each force were opposed by an equal and opposite one, either active or passive. This can be shown graphically, as in Fig. 8, by setting down a line under  $W$  equal to  $W$  (here assumed as 5 tons) to any scale of weights, and completing the shaded parallelogram. Ordinates drawn from beneath the cantilever to the lower limit of the parallelogram will give the shearing strain, to the same scale, at any point.

When a cantilever carries a distributed load, the shearing strain is only equal to the total load at the point of support, and uniformly diminishes as the reaction is met by one portion of the load after another, until at the end of the cantilever there is no shear at all. This can be shown graphically, as in Fig. 9.

When a cantilever extends beyond the point of application of the load, there is, of course, no shearing strain beyond that point, save that

caused by the weight of the cantilever itself; and this, though occasionally of considerable importance in practical work, is rarely taken

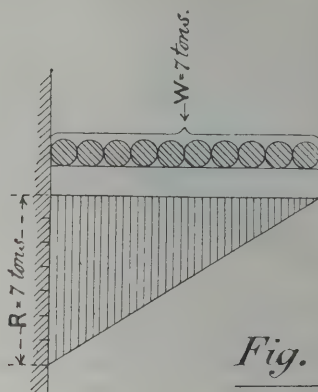


Fig. 9.

into account in purely theoretical investigations.

When a cantilever has to bear two or three different loads, the shearing diagrams have to be combined, as in Fig. 10, where a cantilever is represented as bearing a fixed load of three tons at one quarter of its length from the support, and a distributed load of five tons spread over the half of its length furthest from the support.

A fixed load on a beam causes a shearing

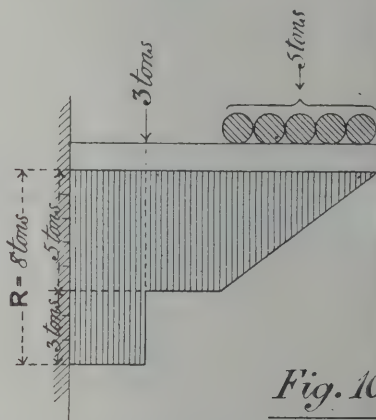


Fig. 10.

strain at all points between its point of application and either support equal to the reaction at that support. The reason for this is the same as in the case of the cantilever: at every point between the point of reaction and the point of application of the load, the reaction is endeavouring to tear its way through the beam to reach the proportion of the load which equilibrates it. In Fig. 11 the dotted outline

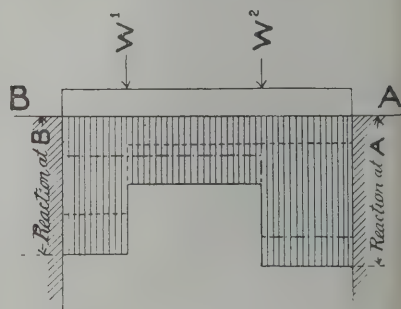


Fig. 11.

denotes the shearing diagram due to  $W_1$ , the dot and stroke outline the diagram due to  $W_2$ , and the firm outline the combined diagram found by adding together at all points the shears due to  $W_1$  and  $W_2$ .

It must be particularly noticed that between the loads the shear produced by the one is augmented by that produced by the other, and not diminished. At each point between these



loads, to use a simile previously employed, two pairs of scissors are acting, one with a force equal to the reaction of  $W^1$  at the abutment A, and the other with a force equal to the reaction of  $W^2$  at the abutment B, the resultant shear being the sum of these two forces.

This fact, though generally admitted in cases where there are but two or three loads under consideration, has by some strange chance been overlooked by most teachers of this subject when the number of loads is unlimited—in other words, when the beam is carrying an evenly distributed load. Thus, the fallacious conclusion has been arrived at that such a beam may be treated as two similar cantilevers of half the span meeting at the centre, thus producing a shearing stress at each support equal to half the total load, and at the centre, of nil. The shearing stress at each support certainly is equal to half the total load, for it is equal to the reaction at the support; but if two loads cause a shear in the centre, which is equal to the sum of the shears produced at that spot by each, it follows that where there are an infinite number of infinitely small loads on each side of the centre, each one of which causes a shearing strain at the centre, the sum of these must amount to something.

If, as in Fig. 12, a definite number of definite

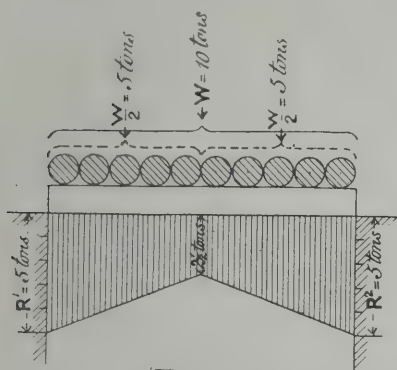


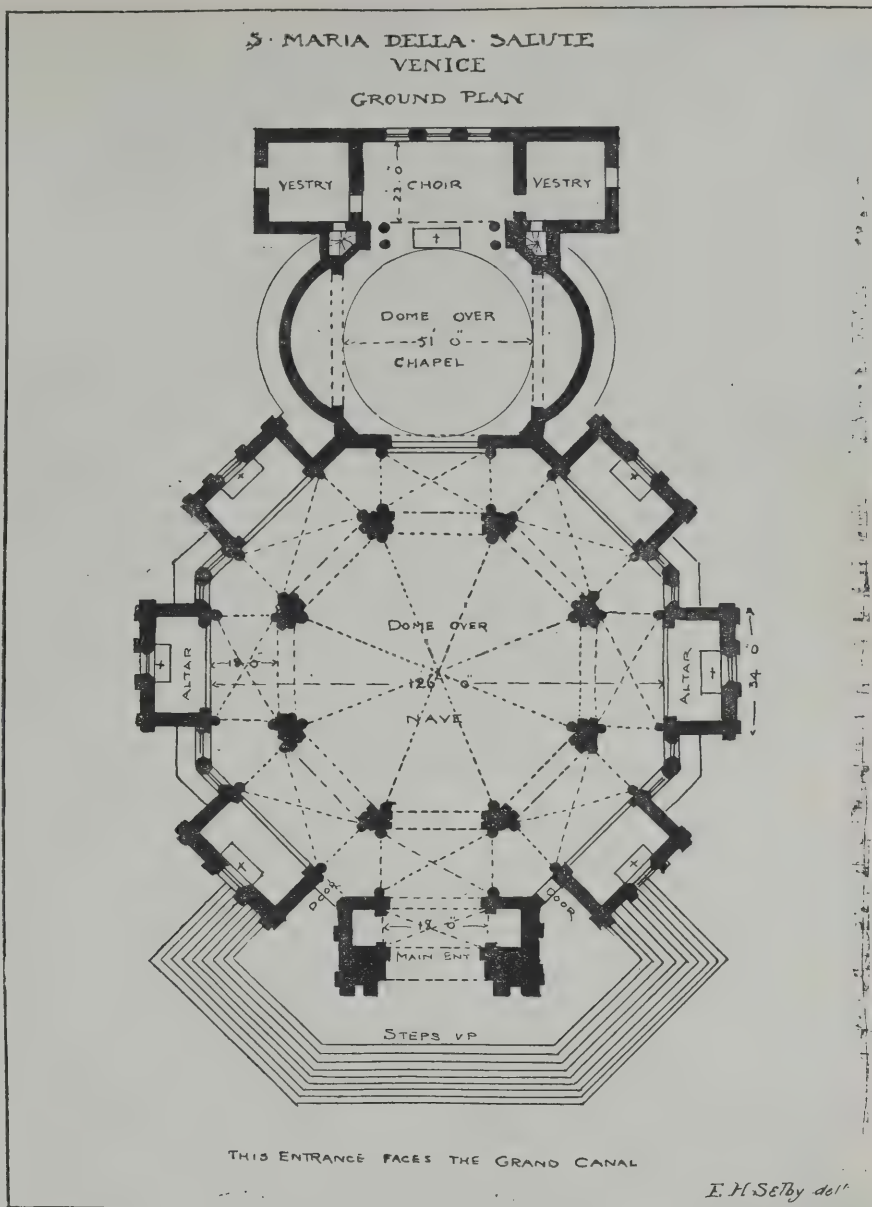
Fig. 12.

small loads be taken, making an aggregate of  $W$  (in this example taken as 10 tons), and if each load be treated separately, and the shearing stresses produced added together, it will be found that while the shear at each abutment is equal to  $\frac{W}{2}$  (5 tons), the shear at the centre is equal to  $\frac{W}{4}$  (or  $2\frac{1}{2}$  tons). The diagram for a truly distributed load may be completed by straight lines, as in Fig. 12.

That the shear in the centre is equal to  $\frac{W}{4}$  (or  $2\frac{1}{2}$  tons) is easiest proved by assuming that the load lying on each side of the centre may be represented by a fixed load of the same amount acting at its centre of gravity—i.e., by a load  $\frac{W}{2}$  (or 5 tons) acting at  $\frac{1}{4}$  the span from each abutment. One-fourth of each of these loads,  $\frac{W}{8}$  (or  $1\frac{1}{4}$  tons), is borne by the abutment furthest from it—in other words, each of these loads causes a shear of  $\frac{W}{8}$  (or  $1\frac{1}{4}$  tons) in the centre, making a total shear in the centre of  $\frac{W}{4}$  (or  $2\frac{1}{2}$  tons).

#### SANTA MARIA DELLA SALUTE, VENICE.

WE gave a photograph of this well-known church in the BUILDING NEWS for June 15th last, with a description of the building. To-day we supplement these with a plan, showing how cleverly the aisle and chapels round the dome are managed. Mr. E. H. Selby, in his sketch, gives the leading dimensions in figures for reference. In this connection it may be interesting to note a somewhat similar plan in general outline, but quite of another date and type of design—viz., the Liebfrauen Kirche, or Church of our Lady, at Treves. A square occupies the centre of the building in this case, and it is crowned by a lantern or tower. The chapels occupying the cardinal points of the plan, after the fashion



of nave and transepts, are octagonal-ended, and the two intermediate chapels diagonally situated within the triangular spaces thus formed between the ends of the transepts, nave, and choir (which has a semicircular apse) are also semi-octagonal. A similar arrangement to this is to be seen in the choir of St. Yved Braine, near Soissons, which may possibly have been the work of the same architect, being about ten years earlier than the Treves example (1227 A.D.). San Thomaso in Limine Bergamo is a well-known circular church, having an octagonal arcade within, forming an aisle all round the building; and Oster Lars Church, Bornholm, Gothland, has a solid wall inside, thus separating the aisle from the church. The roof over the main body of this building is conical. The choir is oval-shaped on plan, and the apse beyond is semicircular. Thorsager Church has a square formed by four columns in the centre of the circular nave, surmounted by a side-lighted lantern above a second church on the upper floor (Marryat's "Jutland and the Danish Isles"). Hagley Church, Gothland, should also be named as a singularly-treated circular church (Fergusson's "History of Architecture," Vol. I., Figs. 530-531). St. Lorenzo, at Milan, has an unchanged plan of great antiquity developed towards the type of domed churches of the Byzantine style, and is the earliest attempt to bring the circular church into a square shape. The diameter of the dome is 70ft., some 20ft. less than that of Sta. Maria della Salute. Ravenna possesses several circular buildings, one of the oldest of Christian origin being the baptistery of St. John; but the great church of St. Vitale furnishes one of the most remarkably complicated and beautiful circular buildings to be seen any-

where. It corresponds closely with the plan of the Minerva Medica at Rome, except being an octagon instead of a decagon. The central area is 50ft. in diameter, so that the dome here is a third less than that of its prototype. It is constructed of earthen pots and covered by a roof. The tomb of Theodoric, also at Ravenna, known as Sta. Maria Rotunda, is 45ft. in diameter, and the most singular part of this building is that the domed roof is formed by one great slab, internally measuring 30ft. in diameter, and hollowed out like a flat dome. Near the edge are a range of false dormer windows, which furnished really the handles by which the slab was originally lifted. St. Angeli, Perugia, the Baptistery at Nocera dei Pagani; the Tomb of Sta. Costanza, Rome; and the Baptistery of Constantine are instances of Romanesque circular buildings. The Chevet Notre Dame due Port Clermont, Auvergne, if doubled, would be very like the plan of Sta. Maria della Salute, only that the chapels are semi-apses.

The Council of the Surveyors' Institution have applied to the Metropolitan Board of Works Commission for an official copy of all the evidence given, or to be given, by surveyors and others during the course of the inquiry.

Memorial stones of the Wesleyan Chapel at Illogan, Redruth, were laid on the 6th inst. The internal fittings will be in pitch-pine, as well as the rostrum; the ceiling of chapel will be panelled in plaster, and the front will be in granite, with Elvin stone filling, the windows will be glazed with cathedral glass. The builders are: Mr. W. H. Moyle, of Chacewater, carpenter; and Mr. W. H. Gray, of Redruth, mason; and the architect Mr. Oliver Caldwell, M.S.A., of Penzance.



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## OUR LITHOGRAPHIC ILLUSTRATIONS.

## THE NUTTER ORPHANAGE FOR BOYS, BRADFORD.

THIS building, which is intended for the maintenance and education of orphan boys in Bradford, is the outcome of a bequest of £10,000 by the late Mr. Joseph Nutter, of Halifax, formerly in business in Bradford. Mr. Nutter made it a condition that the money was only to be paid if within twelve months after his death some person or persons purchased or gave a suitable piece of land or buildings for the purpose of establishing the institution. The Town Council of Bradford felt it to be their duty to secure for the town the benefit of Mr. Nutter's munificent gift; and accordingly, with the authority of the Lords of the Treasury, they conveyed, free of charge, to trustees, the land forming the site of this building, and the grounds connected with it. The above sum has been duly invested, and the proceeds are set apart for the maintenance of the institution, the money required for the erection and furnishing of the orphanage having to be provided for by public subscriptions. The foundation stone was laid by the Mayor of Bradford (Alderman J. L. Morley) on May 31 last. The building covers an area of 99ft. by 49ft., and contains on the ground floor boys' day-room, dining-room, lesson-room, sick boys' day-room, committee room, master's room, lavatory, and ample kitchen arrangements. On the first floor are four dormitories for 40 boys, a sick boys' dormitory, master's bedroom, bathroom, w.c.'s, and linen room. A large room on the second floor will be used at present as a play-room, but may be used, if required, for 12 additional beds. As there is a higher board school within seven minutes' walk, the children will be sent there, and no provision is therefore made for teaching them in this building. The area of the site given by the town council is 3,000 square yards, and being situated between a large public recreation field and Horton public park gives exceptional advantages to the institution without burdening it with the maintenance of extensive playgrounds. The architect of the building is Mr. Thomas Campbell Hope, of Bradford. The contractors are Mr. William Holdsworth, mason; Mr. James Deacon, joiner; Mr. Richard Hill, plumber; Messrs. J. N. and A. E. Thornton, slater; and Mr. Benjamin Dixon, plasterer; all of Bradford and the neighbourhood. The amount of their contracts is £3,023. The building is faced entirely with common hammer-dressed wall stones and bosted ashlar dressings from the Bradford quarries. The interior will be well and substantially finished in every respect, and great care will be taken to insure the health and comfort of

the inmates by the use of the best warming, ventilating, and sanitary appliances. In addition to the above-named sum of £3,023, money will be required for furnishing. Nearly £3,000 has already been subscribed. One of the leading features of this institution is that friends of orphan boys will have the opportunity of sending them here on payment of a small annual contribution towards the expenses of their maintenance.

## DESIGNS FOR A GARDENER'S COTTAGE AND FURNITURE.

For description see page 90.

## OLD OAK ROOM, FROM KING'S LYNN.

THIS illustration is of a very interesting oak room, which was taken from an old house at King's Lynn, and is now erected at Mr. J. Mortlock's galleries in Oxford-street. It was made in the time of James I., is in a very good state of preservation, and beautifully carved. The house in Queen-street, where it originally came from, was inhabited by the Taylor family. Sir Simon Taylor lived there, who contested King's Lynn against Lord Keeper North. The dimensions of the mantel are about 7ft. in height and 11ft. in width. It is ornamented with ten figures in relief, representing Hercules, Medusa, &c., and bears the arms of Britain, quartered with those of France, and the mottoes "Hony Soyit Qui Maill Pences," and underneath "De it Mon Droit." There was a very curious tower at the back of the house, apparently used as a look-out on the river, and which, as it shows signs of rough usage from artillery, local tradition ascribes to Cromwell's soldiers. On removing the panelling from the adjacent room, the date "February, 1602," was found rudely cut in at the back. The mantelpiece and panelling was painted white in the last century, but has now been partially cleaned, and shows some of the good old oak. The room is well worth a visit from any one interested in genuine old work that has never been in any sense restored, and it can be seen at 31, Orchard-street, Portman-square.

## CLIEVEMERE, MAIDENHEAD.

THIS house is in course of erection on a fine natural terrace, well wooded, and facing the river, with the Cliveden woods beyond. The materials used externally are deep-coloured red Maidenhead bricks, and Bath-stone dressings, and cypress fir has been used in some of the long lintels. The rooms lead out of a triple central hall, or hall with ante-rooms so placed as to give a broad view of the gardens and woods beyond, as seen on entering from the approach drive. The architect is Mr. Edward Francis C. Clark, of 7, Westminster-chambers, and the builder is Mr. Thomas Crossley, of Bromley, Kent.

## RATHHAUS AT MOLSHEIM.

THIS picturesque building comprises an assembly hall on the upper floor, approached from the public street by means of an external staircase, and below, on the ground floor, is the Butchers' Market, to which the semicircular arches form the entrances. Our illustration is taken by permission from the last part of "Denkmaeler Deutscher Renaissance," by Herr K. E. O. Fritsch, and published by Ernst Wasmuth, of 35, Markgrafenstrasse, Berlin. We have already drawn attention to this most admirable work, which consists of an extensive series of permanent ink phototypes, equal in tone and texture to delicate silver prints, illustrating the Renaissance of Germany. Molsheim is really in France, of course, in the Lower Rhine, some ten or eleven miles W.S.W. of Strasburg, seated on the River Brusch. The town is quite small, with only from three to four thousand inhabitants; but its wine trade and manufactories of sword blades, wire, and ironmongery give it importance. The general outline of the façade of this charmingly-designed Rathhaus is very materially enhanced by the clock turret which surmounts the entrance porch in the centre of the front. The upper part above the dial is covered with small slates like the curved-shaped roof which surmounts it. A niche on the street side contains a figure of the Blessed Virgin and Child; while below this group, two boys, one on either side of the curved pediment, give dignity and interest to the composition.

An astronomical dial occupies the central panel above the time-piece, and standing on the right and left of the clock are two full-length figures of recording angels, who strike the hours and chimes on the projecting bells which hang in front of them. Two little windows in the return walls of the tower light the clock chamber, and under the main cornice is another dial, probably intended to record the four seasons, or perhaps the periods of the day. Shaped gables terminate the front, at each end of which are large wrought-metal gargoyles of grotesque design, boldly projecting diagonally with the elevation. Two small doorways from the assembly hall lead on to stone-corbelled balconies, which have open-traceried balustrades pierced in Flamboyant patterns, and corresponding with the parapet to the staircases below. The main walls are plastered, with the stone quoins at the angles and window openings shown. The long-drawn shadows of the early morning sun in the photograph furnish quite a sciographic study for the architectural draughtsman, and considerably enliven the quaint effect of the building. Molsheim is also possessed of a fine parish church, originally intended for a Jesuit College, and remarkable chiefly for the extreme lightness of its bell towers. The building contains a curious combination of Gothic and modern sculptures. It may be interesting to give a note here mentioning for reference some other notable German buildings of the class to-day illustrated; one of the most important and monumental being, of course, the richly-ornamented and arcaded Rathhaus at Bremen, which at once furnishes a typical example of the Renaissance. The notable, large porch added to Cologne Old Rathhaus in 1571 is a curious instance of the use of the pointed arch with Classical columns and cornices. It figures in Fergusson's "History of Modern Architecture." The Lubeck Rathhaus, with its inclosed external staircase, we have quite recently illustrated (see BUILDING NEWS, July 2, 1886). and the Gothic stone Rathhaus at Halle is curious for its Late German inverted arches over the window openings, and for the quaintly-shaped brick gable enriching its main façade. That at Altenberg, by Nicolaus Grohmann, the architect, has a tall tower and a square conical roof over the main building. The Rathhaus at Heilbronn is similar in general character to Molsheim having a clock turret in the centre of the front with the characteristic addition of an open arcade below. It dates from 1535 to 1596. A far richer clock, of much more interest, is to be seen in the elevation of the Rathhaus at Ulm with its Zodiac signs and other specialties of horography. A very charming timber-built Rathhaus exists at Schwabenberg in Westphalia, not far from Paderborn, erected in 1579, with carved wooden gables and an enriched arcade below of the same material. There are some good houses of a like kind at Rinteln, in the district of Schauenburg, where we see, too, a very picturesque Rathhaus worth naming. At Paderborn also is a remarkable stone-built Rathhaus, dated 1612-1616. At Halberstadt is an even more celebrated example standing in a fine open "place" surrounded by gabled houses and other buildings. The gabled Loggia and double staircase in the side façade was an addition to the older Gothic hall in 1663, and is particularly interesting for the German rendering of Italian detail which it displays. Something like this are the porch and staircases to the Rathhaus at Limgo in Lippe-Deimold. The grand old Mediæval town hall at Breslau, standing in the Grosser Ring of that busy city, is a florid specimen of 16th-century Gothic, bristling with turrets, gables, and oriels. Markt-Breit Rathhaus dates from the earlier part of the same period, with later alterations, of course, to which date of work the quaintly-devised gables are ascribed. It stands on a bridge partly over the river and partly over the street, and it is said to have been built thus to avoid removing existing buildings when a larger hall than formerly stood here was required. The picturesque effect thus secured is very characteristic of Mediæval German architects. Limburg-on-the-Lahn Rathhaus is another irregular artistic structure, and comprises by no means the least picturesque of the old buildings of that curious town. Ratisbon Rathhaus, built too entirely of stone, should be noted, and it has a projecting oriel covered by



a gable in the centre of the main façade. The conical roofed turrets which inclose oriels form the distinguishing features of the very pretty Rathhaus at Friburg in Wetteravia, a mountain townlet by the river Ussach. They stand at the two ends of the front elevation, and a stone arcade extends the whole width of the ground story. In the centre, on the first floor level, is a wooden projecting balcony. At Tübingen, in the Rathhaus there, we note an open pulpit under a roofed hood of quaint proportions, and a florid curved gable inclosing a clock dominates the centre portion of the building. Many of these buildings thus referred to are illustrated in Herr Wasmuth's delightful publication, from which our plate of Molsheim Rathhaus is taken.

THE MEISTERSINGERS' CLUB, 63, ST. JAMES'S-STREET, LONDON.

THIS building, which has just been completed on the west side of St. James's-street, occupies a site having about 50ft. frontage and 115ft. depth. The site was formerly occupied by Fenton's Hotel. The first and second floors are planned for the occupation of the Meistersingers' Club, a musical club of the same character as the Lyric, and the principal chamber in the club is the concert-room, a room about 50ft. long by 25ft. wide. The other apartments belonging to the club consist of a smoking-room, 45ft. by 24ft., small dining-room, drawing-room, and billiard-room, the usual rooms for the service of a club, and retiring rooms in connection with the concert-room. The club is reached by a staircase quite independent of the rest of the building. The ground-floor and basement have been let temporarily to the London Joint Stock Bank for their West-End branch, during the rebuilding of their premises in Pall Mall. The third and fourth floors are planned to be used or let off as bachelors' chambers, and have a separate and independent entrance from St. James's-street. The fifth floor is entirely devoted to the service of the upper rooms. The public footway leading to Blue Ball-yard runs under the south side of the building. The front, which is of Portland stone, considerably enriched by carving, has been broken up on the first and second floors by projecting bays, and on the third and fourth floors by a recessed centre. The upper floors are served by a hydraulic lift, constructed by Messrs. Archibald, Smith, and Stevens, and the carving was executed by Seale, Messrs. Colls and Sons, builders, of Moorgate-street, are the builders. The Coalbrookdale Company supplied some of the side chimney-pieces. The architects are Messrs. Davis and Emanuel, of 2, Finsbury-circus.

#### WAYSIDE NOTES.

**L**ORD HERSCHELL has taken the cream of the evidence in connection with the Board of Works Inquiry. The reports are now comparatively tame, although what may be yet divulged it is impossible to say. Many other departments of the Board have, I believe, still to be examined. The recalling of Sir Joseph Bazalgette last Tuesday did not result in anything curious, although many may think it strange that a supervising engineer should be satisfied with "sound square stocks" when "picked stocks" were particularly specified. This, however, is a point that we can understand, even if the public imagine that they have not quite had their money's worth in the new Battersea Bridge contract. So long as a brick is sound, square, and well burnt, there is nothing to be gained by constructing a wall throughout of "picked" ones. A great and new discovery this, for which the reader will give me due credit.

If the remaining evidence of the Board of Works inquiry proves to be insipid, the reader may look for some lively reports if there should be an inquiry into the working of the London School Board. The last meeting of the Board was rather stormy, individual members alluding to the "scandalous state of things that existed in the Works Department," and to the "thousands and thousands of pounds that had been squandered." Moreover, a serious charge against the late architect of the Board was made by Mr. Blousfield, who moved—"That, in the opinion of the Board, the late architect of the Board is responsible for the absence of proper footings at the Brand-street School,

Ratcliff (Tower Hamlets), and that he be called upon to make good the loss arising therefrom." I hope that Mr. Robson will immediately clear himself of this accusation, as the fault must surely lie in other quarters. Personally, I am little surprised at the incident, as I have always thought that the duties of the architect of the London School Board must be arduous at times, and prevent him giving full supervision to every building in progress. And I have further thought that the present system of employing an architect at a fixed salary is quite unsuitable for such an extensive area as that comprised in the various districts of London over which the Metropolitan School Board reigns supreme. If it be more than one can manage, it is uneconomical of the ratepayers' money; and there is certainly no doubt but that it defrauds us of much work that ought to be put out to competition. "Public money, open competitions," is my motto.

Since last noting the progress that has been made with the Imperial Institute, the Building and Finance Sub-committees have, I observe, accepted the tender of Messrs. Mowlem and Co. for the erection of the central, eastern, and western towers at eighteen thousand seven hundred and ninety-seven pounds. The total amount of the contract for the main buildings is now one hundred and sixty-one thousand five hundred and ninety-seven pounds. Work on the Imperial Institute-road has been commenced, and it is expected that it will be in a sufficiently forward state to be opened as a public thoroughfare in September.

Look out for a competition in Berlin. One day last week I observed in an evening paper that a committee had been appointed, or was about to be appointed, to consider the question of providing a cathedral for Berlin worthy of the chief city of the Fatherland. I conclude that if the idea is taken up the design will be put out to competition, though hardly an international one, as I fancy that the German is much given to Conservative principles when it comes to employing foreigners to design their ecclesiastical edifices. I do not suppose they would have a French design, even if the Parisian architects responded to an appeal for plans, sections, and elevations of proposed Cathedral at Berlin. Personal convenience might tempt M. —, *architecte*, to swallow his national pride, as, if the inhabitants of Berlin are bent on having their cathedral, it will be a pretentious building enough, and the job worth having. It will not be a "stick-in-the-mud" affair, like that at Liverpool."

Your note on the condition of Gloucester Cathedral reminds me that in *Good Words* for the current month there is a charming article on this building, by the Dean of Gloucester. It is entitled "Dreamland in History," and forms the first of a series to be given that should be read by all who love our grand old cathedrals and take an interest in their past history. Moreover, the writing is illustrated by some exceedingly beautiful vignettes by Mr. Herbert Railton. The cloisters, with their exquisite fan vaulting; the elegant Lady-chapel, the Tower, and interior of the south transept are all drawn in that feeling yet powerful style that Mr. Railton has made peculiarly his own. They show the beautiful nature of the Perpendicular work that the old builders so skilfully weaved over the original massive round-arched design. Gloucester Cathedral may, indeed, be called the birthplace of the Perpendicular style, and the monks who so successfully altered the Norman building can perhaps lay greater claim than anyone to having "invented" a new style. The Dean of Gloucester says this great undertaking was finished in 1335, or rather so much of it as is comprised in the south transept; and he concludes his pleasant essay with the following words:—"Sometimes in the late evening-tide, when all is still and quiet, when strangers and attendants are gone—when the great church is half-veiled, half-revealed in the tender grace of the long, drawn-out, soft, summer twilight—I go into that south transept, with its veil of carved stone tossed over the stern, grave Norman work, and gaze on the awful beauty which these workmen, dead and forgotten for more than 500 years, called into being. Then I think

I begin to see something of what Wigmore and his monks had in their minds when they piled their charmed stones one on the other in beautiful confusion as it seems, but really with studied order. I begin to see something of those heavenward aspirations of those monk-architects, whom the Divine and perfect Architect lodged during those long ages—(men are pleased to call dark)—in these quiet peaceful homes of prayer and thought termed monasteries." Yes, in those days they wot not of commissions, let alone those of an illicit nature. Between old church architecture and new church architecture there is a wide gulf whose span is not less than 5 per cent.

If money would produce a grand temple they should some day have one of a truly noble description in Salt Lake City. Four million dollars have been expended on a building there, and it is still far from completed.

The *Portfolio* for July continues a most instructive essay by the editor on "Book Illustration." This, the third conversation between an artist, poet, scientist, and critic, and discusses the question of "utility," and is certainly well worth perusal, as much relates to architecture and architectural drawing. The number contains a beautiful etching of Rossetti's "Ecce Ancilla Domini!" and of "A Windy Day" on what one may take to be the Zuider Zee. Among the articles is one on "Charlecote House," illustrated with some more of Mr. Railton's charming vignettes. The writer of the article, Mr. Sidney L. Lee, thrashes out the question of Shakespeare's connection with Charlecote, where, it appears, the much-abused and immortal bard practised, in the 17th century, the art of deer stealing. It is not very clear, however, whether the deer-stalking took place at Charlecote or at Fulbrooke Park, and we are at liberty to refuse point-blank to admit that the theft was committed at all.

So "Strawberry Hill" was not sold, after all. Buyers of modern-antique residences do not seem to be in anywise plentiful. The "Oaks" on Banstead Downs shared a similar fate to Horace Walpole's little vanity. Strawberry Hill, by the bye, was announced for sale as a splendid specimen of *architecture of the 15th century*, if my memory serves me right, and I do not think I made a mistake, as I cut out the announcement and put it away so carefully that it was not to be found when wanted. One would have thought that the halo of romance round the riverside building and its many associations would have insured a ready sale, even if the purchaser had a few misgivings as to the genuine nature of the architecture. There would be no confusing the architecture of the "Oaks" with that of Mediaeval times, although it is a remarkably pleasant-looking building of its kind, and charmingly situated on a pretty, shady lane on the borders of breezy Banstead Downs, from whence, it has always occurred to me, we can obtain one of the finest prospects in the country. GOTH.

#### THE NATIONAL REGISTRATION OF PLUMBERS.

**U**NDER the presidency of the Mayor of Newcastle-on-Tyne, a largely-attended public meeting was held on Monday night in the council chamber, "to consider the registration of qualified plumbers." Deputations, in most cases consisting of the mayor, medical officer of health, and town clerk, attended from the Corporations of Jarrow, Gateshead, Sunderland, North and South Shields, Durham, Darlington, Stockton, the Hartlepoons, Tynemouth, Middlesbrough, Whitby, Carlisle, Whitehaven, Kendal, Blyth, and other places.

Councillor Winter moved "That a District Council for Northumberland, Durham, Westmoreland, Cumberland, and North Yorks be formed to carry out the system of registration for that district, and that the council shall consist of master and operative plumbers and the public."

Professor Garnett seconded the motion, and gave an account of the work done in technically educating plumbers, and said he was authorised by the masters and operatives of the district to express their approval of the registration system. The motion was unanimously carried.

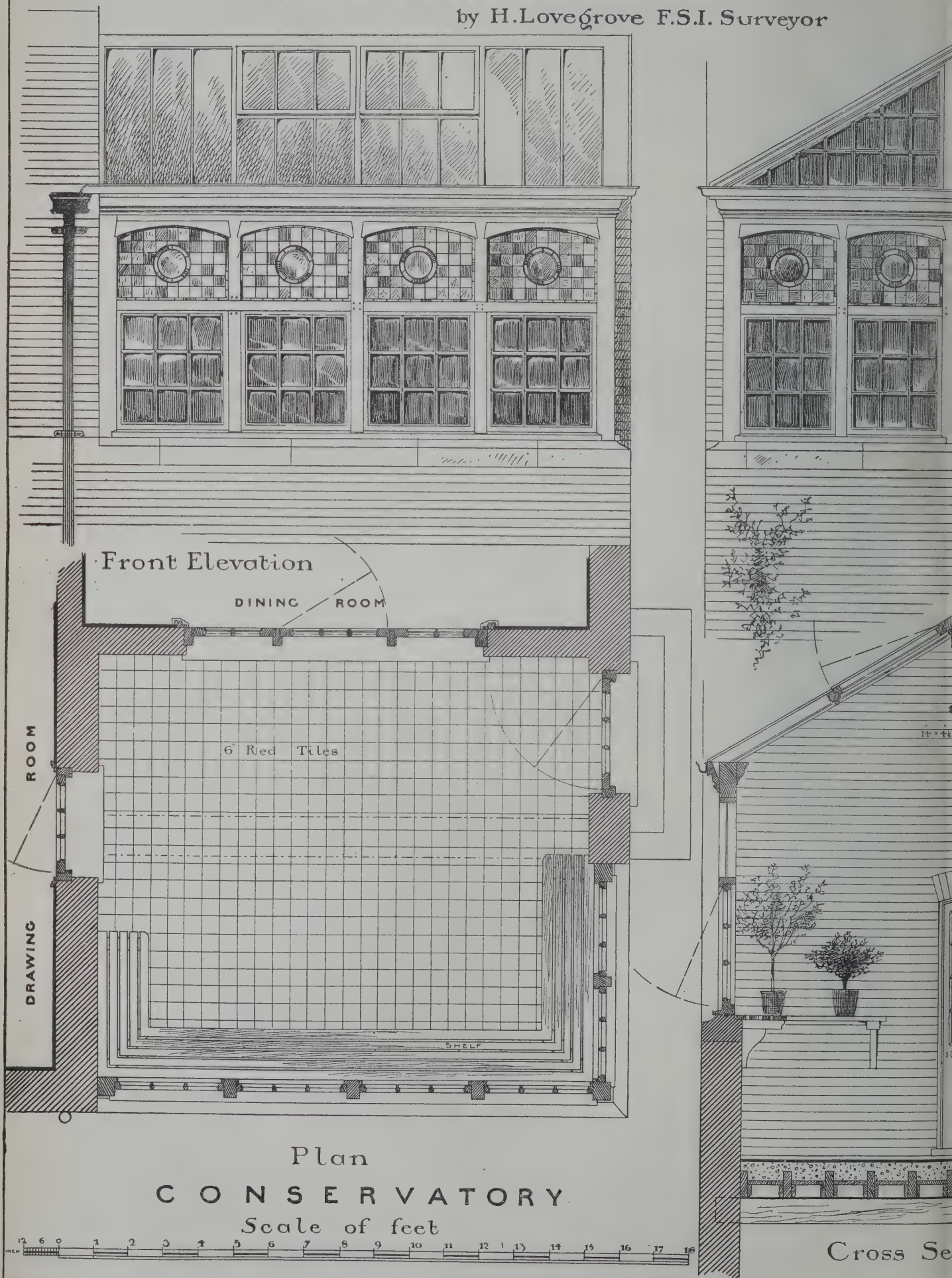


# A CORNER MIDDLE-CLASS HOUSE AT HAMPTON

ILLUSTRATING PAPERS ON  
PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES

Maurice

by H. Lovegrove F.S.I. Surveyor





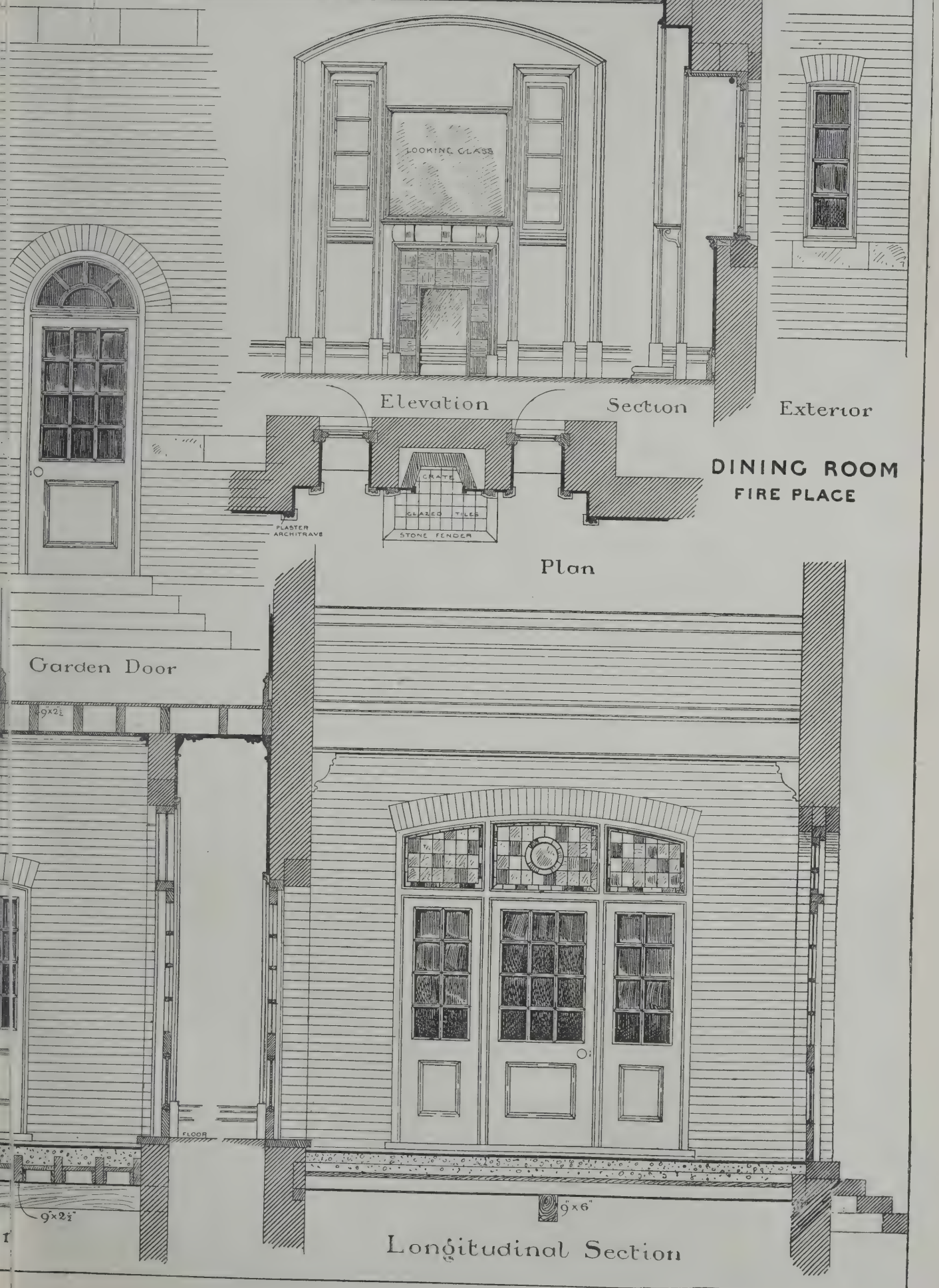
JULY 20, 1888.

HEAD

Adams F.R.I.B.A.  
Architect

DETAILS PREPARED FOR ILLUSTRATION

Nº 3





## "BUILDING NEWS" DESIGNING CLUB.

## A GARDENER'S COTTAGE AND FURNITURE.

NO better evidence of the popularity of our Designing Club could be deduced than the large number of contributions received for this, the last subject for competition in the present course; indeed, the interest in the several contests from month to month has been well sustained, in spite of the lead so persistently maintained at the outset by "Ghost." As at the start, so now in the final heat, he obtains the first place, which, however desirous we may have been to see others share in the honours of our class, we can but willingly accord to him. By reproducing his drawings herewith to-day in conjunction with this review our readers will be enabled, as before, to follow our remarks in detail. The instructions for these subjects were issued thus:—

K.—A Gardener's Cottage, to be used as a lodge, with carriage gateway adjoining, suitable for an entrance to a gentleman's country house of 18th century date. The cottage to comprise a living room, 16ft. by 13ft.; kitchen 12ft. square, a washhouse, larders, oven-place, w.c., ash-pit, and tool-house. An Open Porch to the cottage to form a feature in the design. Three bedrooms and store-space to be provided on the first-floor. The gate to be a wooden one, with wood posts and fence on either side. Scale, 1-6th of an inch to the foot. Elevations, section, plans, and sketch.

L.—A set of living-room and bedroom Furniture suitable for the above cottage, in varnished deal. The living-room pieces to include a bookcase-sideboard combined, 4ft. wide, 3ft. 8in. to table top, and 6ft. 3in. total height; a 4ft. 6in. circular table on tripod legs; an armchair and chimney-piece, inclosing a 15in. wide slow-combustion grate, with course of 6in. tiles round it. The bed-room suite to consist of washhand-stand, table, and 4ft. wardrobe. Scale, 1in. to the foot.

The plates now published show how the selected designs have embodied the requirements here enumerated. With so large a number of plans to notice, our critical remarks here must necessarily be brief. The style in "Ghost's" design hardly suggests quite so nearly as we intended a connection with a mansion of 18th century date. The porch and the circular window "touch in" a point of colour, no doubt, and the side windows of the living room do duty in the same direction; but, strictly speaking, the composition is not classic-like enough, considering congruity merely. As a lodge, however, there is not much to find fault with. The kitchen does not command the road sufficiently, so that the wife, when about her house duties, would hardly be so likely to see anyone outside the gates as if the arrangement of the cottage had been transposed. The entry is good and the passage is roomy, but a direct draught in front of the kitchener is a fault which the house wife would long remember "Ghost" for, and the bakery in so central a position is also a mistake. Fancy the heat in the bed-room over it, and the steam in the cottage generally, to say nothing of the inconvenience of such a plan. The w.c. would be in a warm corner, too, which would not much matter provided it were always sweet and clean, while the water would not be likely to freeze. The wash-house is good, but the bakery should have been adjoining it. Upstairs the plan is admirable. The entrance gates are not well designed for execution in wood: the arched-shaped openings look too much like masonry for our taste. "Ghost's" drawings are effectively done, and well arranged on the sheet. "Boreas" runs him, however, very closely, and for some things almost deserves to be first. For correctness of style he certainly is nearer the mark, and has given us a very pretty lodge; but on the whole "Ghost's" design is the better of the two. The porch should have been at the angle of the public highway and private road. The living room is too broken up in plan, and the entry is cramped rather. The washhouse would have been better more isolated, and the oven is awkwardly situated. The boiler, outside in the open porch, is convenient in one way, but for practical advantage the place is too small. Upstairs the rooms are well arranged. The gates are better in treatment than "Ghost's," and the small gate is a further improvement. "Uncouth Swain" is placed third, with a de-

sign studied on the lines familiar in the work of Mr. Ernest George, and drawn in his manner. The entry is very cramped, otherwise the plan is ingeniously set out, save the fact that no light can reach the landing except from below or from the open doors of the bedrooms. The cottage would otherwise make a comfortable house and a very picturesque lodge. The author has certainly improved in his work, which shows painstaking and study of good examples. "Huz" comes next, but spoils his plan by basing it too much on a villa type of dwelling—living room on one side and kitchen on the other side, with a "hall" in between. In this central distinction of plan the w.c. comes prominently in for a share, making that convenience needlessly conspicuous. The first floor is capital, with roomy chambers. The oven out of the kitchen keeps the flues together, no doubt, but otherwise is an objection. The porch is unnecessarily large, and the bay next it is too close to the greater projection, through which a view would be hardly possible. The style would not be in harmony with an 18th-century house quite. "Scottish Renaissance" tells the style of the design so distinguished, and gives us a very pretty building of a rather expensive character. We like both the elevation and the plan, which fairly well keeps to the letter of our instructions. The author should have joined our class earlier. Upstairs space is wasted by the passage-way necessary to reach No. 3 bedroom. The washhouse, bakery, and kitchen would have been improved if they had been separated. The staircase is placed in a circular tower. "Bee" has given us a diagonally-disposed plan, which has its merits, though the disadvantages preponderate in our judgment. The rooms are squarely planned, but the staircase is isolated too much from the entry and administrative part of the scheme, making too much of what ought, in so small a house, to be minimised. The drawings are fairly well delineated in brown ink. "Mayfly" drops down a stage or two in comparative merit with the funny-looking cottage, furnished with a V-shaped bay to the parlour and a timber-built store-place surmounting the porch and carried on brackets in a comical way. The gables are ugly, but the plan is rather good. "Launcelot" has sent a design which strictly follows the lines of the style stipulated in our conditions and adhering to the mode of Gibbs, Kent, or Ripley plans, the elevations with wings, central pediment, and stately blank wall spaces. The arched porch runs up into the first floor, and so lights the landing, taking at the same time all scale out of the building. The attempt has not resulted in a failure quite, and illustrates some taste, though we cannot commend the plan. The first floor is on two levels, and too much space is demanded for the "hall." The gate is out of character with the lodge. "Twig," if less mannered and more original, is hardly so good, for there is a ring of rigid propriety about "Launcelot's" design. "Twig" aims at cleverness, and succeeds in supplying a tolerably successful plan. The oven out of the kitchen jamb is a curiosity in matters of minor consequences, and the flat over the loggia-like porch, with the heraldic shield at the angle, is a poor termination to so striking a "feature." The ball on the corner of the wall only makes matters more trivial. "Apex" will have to work hard to reach the top of the ladder if this is the best he can do, with such a motto, too, as an evidence of intention. He works carefully, and we think his design shows that he means to do better. The brick built porch and brick-shaped gable we cannot admire nor compliment him on his plan, which is crude. "Spare Time Well Spent" goes in this time for the Portland cement Italian style of the "desirable residence" type, and shows his building by means of a well-drawn perspective in pen and ink. "Too consequential" is the remark naturally appropriate to this elevation from an architect's point of view; but it is not vulgar, neither does it display exactly a want of taste, and the plan is not a bad one; but the house, whatever else may be urged in its favour, is not a gardener's cottage, and that is what we asked for. Next in order ranks "Cosmos," who cannot be described as a good planner. His cottage would not be convenient, and though he gives the dimensions stipulated for, the ground-floor space is so disposed with doors and windows, borrowed lights and fireplaces, that little room

is left for furniture and comfort. His elevations look high-shouldered. "Tol Peden Penwith" has on this occasion painted in water-colours, and so finished off his picture of the cottage which bears his name. In a way this design is an improvement on former efforts, which we note with pleasure. His plan is compact, too, and convenient, though upstairs too much is made of the store place, and the passage way out of No. 2 bedroom to reach No. 3 shows want of thought. Bedroom No. 1 is over-windowed, and all for the sake of exterior effect. The lodge has nothing about it specially in harmony with a "Gentleman's Country House of the 18th Century." The designs grouped in the third order of merit are these: "Old Gold," who is better than usual, which remark means well, for he has tried his best; "H. M. S. Conway" has cramped his plan too much, and marred his elevations by the scrolls to the porch and bay. Then the oven place is absent, while the third bedroom is merely a box, and has no fireplace. "Jo's" house is ugly, and the kitchen door, first in importance on entering the external porch, is a very badly-contrived blunder. The "rustic" gate is "a terror," too. "Renaissance," "Compton," "Serge," and "Lawton" conclude the series.

Of the furniture designs suitable for this cottage "Ghost's" set is decidedly the best, and we herewith print his drawings. The bookcase-sideboard is both suitable and simple, reminding us of some Early pieces of furniture designed by Mr. C. L. Eastlake, of "Household Taste" reputation. The circular table is incorrectly drawn, and looks to be one-sided. The dressing-table is a rather original arrangement, and the wardrobe is commonsense enough, though the hanging cupboard is too short for suspending dresses in. The chair is of the High Wycombe type, and the chimneypiece will pass muster. "Boreas" is awarded the second place, and we shall illustrate both his lodge and furniture designs in an early number. His armchair is too expensive for a cottage, with its cushioned back. The tripod table we like better than "Ghost's," and the bookcase-sideboard is a practical piece, and so is the wardrobe. The washhand-stand and toilet-table are combined in one article, and the chimneypiece would look very well in execution. With these remarks our notes close for the BUILDING NEWS Designing Club, session 1887-1888.

## ASSOCIATION OF MUNICIPAL ENGINEERS.

THE 15th annual meeting of this Association was held on Thursday, the 12th inst., at the Institution of Civil Engineers, under the presidency of Mr. E. B. Ellice-Clark. The annual report showed that there were 349 members, representing the principal towns throughout the country, and there was a credit balance of £369 1s. 9d. The President in his address suggested that technical classes for sanitary engineer students should be established in connection with Owens College, Manchester, Mason's College, Birmingham, the Yorkshire College, Leeds, and similar colleges in the provinces. Referring to the work yet to be done by sanitary engineers, he expressed the opinion that there were more than 375,000 houses in London of over £100 annual value in which new drainage works were absolutely necessary. A similar state of things existed to some extent in every provincial town. Much required to be done in connection with the arterial drainage of towns, the prevention of floods in the great river valleys, and to further improve the sanitary condition of towns. The method of obtaining heat in dwelling-houses was only one step removed from the consumption of fuel in an open hearth in the tent of the savage. One-half of the effective value of fuel was wasted and the air of cities polluted. The manufacture and distribution of non-luminous gaseous fuel for heating purposes from a central station was not very far distant. By this means air pollution would be prevented, and there would be no cinders or ashes to be removed from houses. There should be no difficulty in designing such a stove, fed by gaseous fuel, as would in every house consume the decaying matter which now formed the bulk of house refuse. He also advocated a State college, or permanent commission, for making original scientific research, and held







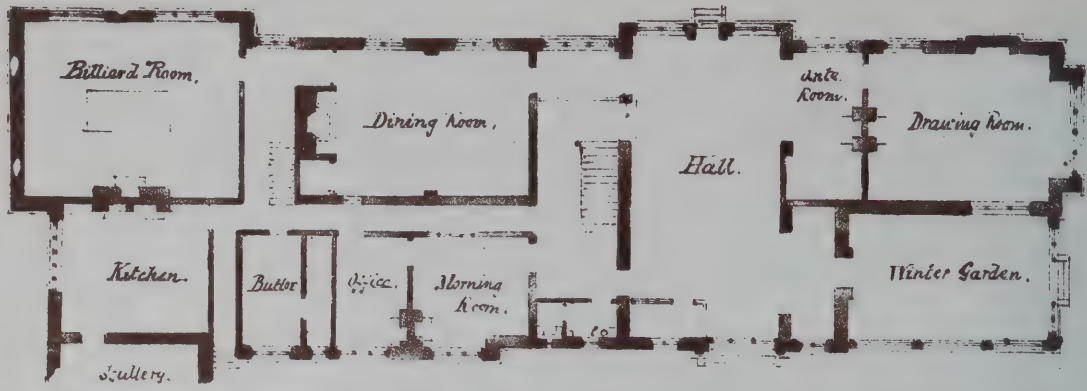
THE BUILDING NEWS, JULY 20, 1888.













JULY 20. 1888.



Lievemere: C. Montagu Jenkin Esq. *Ed. Francis C. Charles: archt.*

"PHOTO-TINT" by James Akerman & Co. Queen Square London W.C.



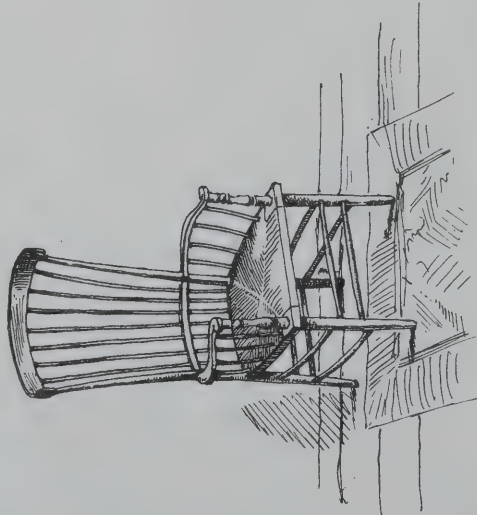




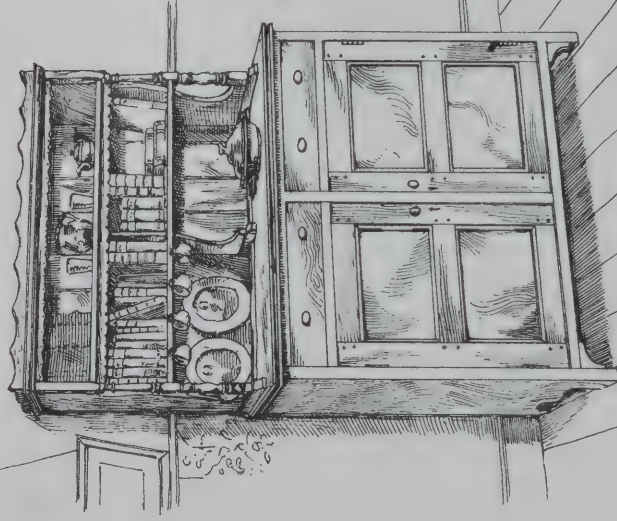




PLACED FIRST



the arm Chair.



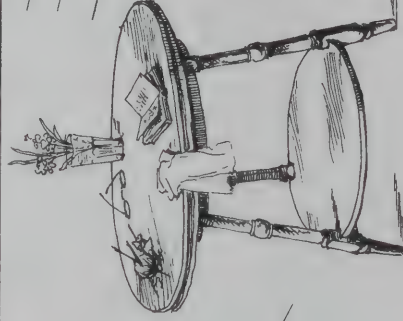
Sideboard Bookcase.

"BUILDING NEWS" DESIGNING CLUB.

Design for Cottage Furniture.

by "Ghost."

Scale 1/4 inch = 1 foot



Circular table.

Washhand Stand.

Note: The cupboard contains a pail for the dirty Water.

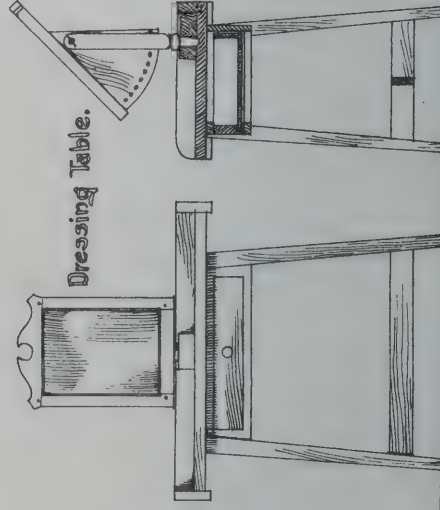


Wardrobe.



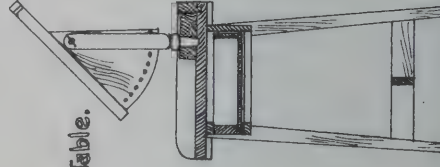
the Chimney-Piece.

Elevation.



Dressing Table.

Elevation.



Section.

Section.



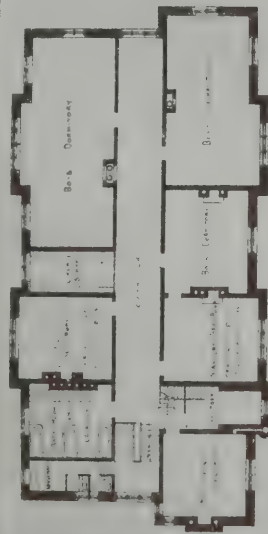




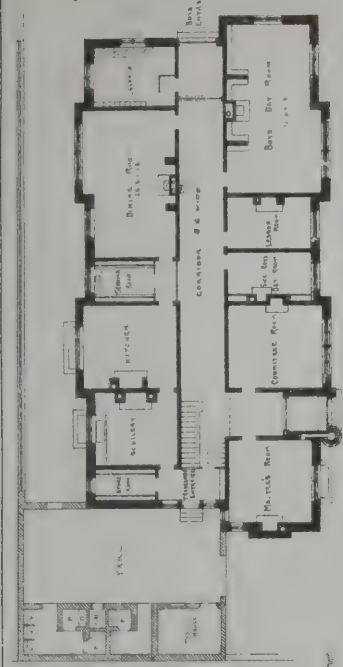
THE BUILDING DEWS, JULY 20, 1888.







FIRST FLOOR PLAN



GROUND PLAN



"Photo-Tint" by James Akerman, 8, Queen Square, London, W.C.

THE: NUTTER: ORPHANAGE: BRADFORD:

T. C. HOPE. ARCHITECT. BRADFORD.





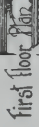
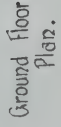


## PLACED, FIRST

to be used as a Lodge.



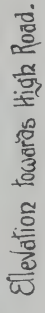
a Section



the Gate.

Sketches

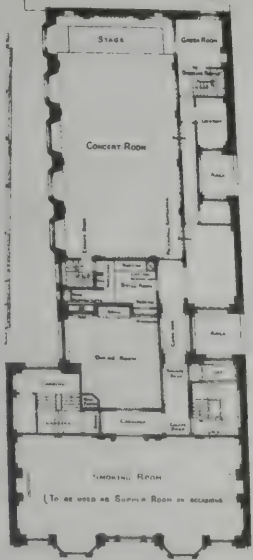
GIANT











ST JAMES STREET

FIRST FLOOR PLAN



THE MEISTERSINGERS CLUB, ST JAMES' STREET, S. W.

MESSRS DAVIS AND EMMANUEL ARCHITECTS

"Photo-Tint," by James Akerman, 6, Queen Square, London, W.C.







that enormous sums would have been saved if even only the disposal of town sewage had been dealt with by such a competent body. Alluding to the Local Government Bill, he expressed great regret that it did not provide for such a readjustment of areas as he thought the exigencies of the case demanded. Papers were read by Messrs. H. U. Mackie, of Carlisle, and E. R. Strachan, of London, after which a visit was paid to the new drainage and ventilation works at the Houses of Parliament, and in the evening the annual dinner took place.

The meetings were reopened on Friday, Mr. E. B. Ellice-Clark again presiding. Lieutenant-Colonel Jones, V.C., read a paper giving 10 years' experience of the "Shone" ejector. Examples were given, including instances at Eastbourne, Henley-on-Thames, and Fenton, Staffordshire, where the system was working satisfactorily. In the course of a long discussion on the paper, the opinion was generally expressed that the "Shone" injector for ordinary purposes of pumping was not equal to existing methods on the score of either efficiency or economy. It was admitted, however, that it is useful under some exceptional circumstances, though it was strongly urged that no reliable data had been given of the actual cost of working the "Shone" in any of the places named. Mr. de Courcy Meade, of Hornsey, read a paper describing the electrical fire-alarm arrangements adopted in that district, and Mr. William Webster, F.C.S., read a paper describing the decomposition and purification of sewage by means of electricity. He passed a strong current of electricity through sewage before the meeting, and the solid matter speedily rose to the surface, leaving the fluid apparently bright. He also exhibited a sample of effluent water eight months old, and also a specimen of disinfecting fluid obtained from sewage 12 months ago. The chief expense, he stated, was the engine power, and the process could be applied to any existing tanks. Several speakers considered the process likely to be productive of great results, provided it could be economically applied to the treatment of large quantities of sewage, as the analysis submitted showed the effluent water to be absolutely free from suspended matter.

#### BRISTOL AND GLOUCESTERSHIRE ARCHÆOLOGICAL SOCIETY.

THE thirteenth annual meeting of this society commenced at Gloucester on Monday and extended to yesterday. The proceedings commenced under the presidency of Lord Sherborne, the retiring president, who introduced the president-elect, Mr. R. V. Vassar-Smith, ex-mayor of Gloucester. The President-Elect read his inaugural address, which had reference to the muniments of the Gloucester Corporation. In the afternoon the Dean received the members in the Chapter-house. The party then divided into three sections, and were taken over the building under the guidance of Mr. F. W. Waller, architect, who pointed out its various interesting features, architectural and otherwise. Subsequently the visitors were taken over the deanery.

A meeting was held at night at the Tolsey reading and discussing papers. Among these Mr. Henry Jeffs read a paper on the "Mason's Square and Masons' Marks." These abound at Gloucester, where there is also, in the south transept, a curious monument in the form of a mason's square, and underneath it figures of a man and a boy, the former having mason's tools in his apron. Tradition says that this is the monument of one John Gower, who was employed in converting the Norman work of the transept into Early English, and that he killed the boy, who was his apprentice. Mr. Jeffs showed that neither the modern fraternity of Freemasons, nor the lodges of Mark Masons, had anything to do with the masons' marks in buildings. He owned that these marks were to be found in ancient buildings in Egypt, on the Pyramids, in Greece, throughout Europe, and in Mexico, Peru, &c., while some of those in Gloucester Cathedral resembled the marks found in Carthage and in the Egyptian hieroglyphics. He suggested that these marks, which had long formed an enigma apparently not to be solved, were nothing more than marks made by the workmen, just as used to be and

was still the practice for workmen in the porcelain manufacture to put a mark on their products. He considered that the modern trade mark was simply an imitation of these masons' marks, and that many of the marks on old stones in our churches were cut by the workmen as a pastime, as men nowadays cut their names in oak benches.

Mr. Henry Medland, architect, had prepared a long and interesting paper on "St. Oswald's Priory, Gloucester." The earliest presumed foundation of this institution was given as about 660; but the more generally received account was that it was founded in 909, by Ethelred, Prince of Mercians, and his wife Ethelfleda, daughter of Alfred the Great, in honour of St. Oswald, king and martyr. Mr. Medland gave an outline of all that is reported of Oswald, traced the history of the priory, and showed that at the dissolution the seven canons who then occupied the priory were sent forth to the world with 16s. 8d. divided between them. The south aisle of the priory church became the parish church of St. Catharine, but at the siege it was greatly damaged, and the Parliament gave the building to the corporation, who used the roof and part of the material in the erection of a barley market in another part of the city. What remains of the ancient church is now a beautiful ruin, and, thanks to Mr. Medland's care, many fragments of the old priory are built into it. The other part of the priory has entirely disappeared, and some of the estates were given by King Henry VIII. to the Dean and Chapter of Bristol. One most interesting feature of Mr. Medland's paper was an account of the discovery by him, a month ago, of a beautifully sculptured stone, bedded in a wall adjoining the priory. This stone evidently formed the shaft base of a churchyard cross; the sculpture is Celtic in character, and it is suggested that it formed part of a memorial to St. Oswald, and was the work of an artificer from Iona or Lindisfarne.

#### PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—II.

By HENRY LOVEGROVE, F.S.I., Surveyor.

11. **MORTAR.**—The mortar to be composed of one part of freshly-burnt grey-stone lime of good quality to three parts of clean sharp sand (no mould or screenings to be used); the whole to be mixed in a mill or on a boarded platform. Good well-burnt ballast may be used, but the proportion must not exceed one-third to two-thirds of sand.
12. **Cement.**—The cement to be the best Portland cement from an approved manufacturer, one part to be mixed with three parts of clean Thames sand.
13. **Bricks.**—The whole of the brickwork is to be done with hard well-burnt grey stocks, laid with a proper bond, and well flushed up every four courses, no four courses to rise more than 12in.
14. **Facings.**—The external faces to be of the best red bricks from Messrs. Lawrence, of Bracknell, properly bonded, and with neatly-ruled weather-joints. The pends to be properly kept, and all reveals to be truly worked.
15. **Dampcourse.**—Lay in all walls, at the level of 6in. above ground level, two courses of slates laid to break joint in cement.
16. **Arches.**—The arches to be of good rubbers, gauged, set in putty, and pointed. The skewbacks to be as slight as possible. Turn half-brick trimmer arches in cement to all the fireplaces above the basement. Turn roughly-axed discharging arches over all door and window openings, those in internal walls to be the full thickness of the walls, and to spring from the ends of the lintel.
17. **Vaults.**—The vaults where shown to be in two half-brick rings.
18. **Walls.**—Lay in the footings with regular offsets, two courses to one brick, and three to the brick-and-a-half walls, and carry up the walls to the heights and dimensions shown on the drawings.
19. **Half-Brick Walls.**—All internal partitions which have not false bearings are to be of half-brick in Beart's solid bricks, set in cement.

20. **Sleeper Walls.**—Build proper fender and sleeper walls in basement, with two oversailing courses to take sleepers.
21. **Chases.**—Leave chases for soil and other pipes; cut all spalls, skewbacks, chamfers, and all other cuttings; bed all stone or wood lintels or templates; bed and point up in lime-and-hair mortar all down, and window frames.
22. **Cuttings.**—All skewbacks and other fair cuttings to be neatly executed.
23. **Weatherings.**—The four top courses of all chimney stacks to be set in cement, and all sailing courses and other external projections are to be weathered in cement.
24. **Copings.**—All walls for which a stone coping is not described (or shown) are to be finished with hard stock bricks on edge, and double tile creasing, all in cement.
25. **Wedge and Point.**—Rake out joints of flashings, and neatly point in flashings in cement.
26. **Flues.**—The flues to be very carefully carried up; pargetted with cow-dung mortar, and properly cored at the completion of the works.
27. **Chimney Bars.**—Put 2in. by 3in. wrought-iron chimney-bars (3in. by 3in. to kitchen), and 18in. longer than the openings, the ends split and turned up and down to all chimney-breasts with a relieving arch over same.
28. **Setting Stoves.**—Properly set the kitchener and the whole of the register stoves throughout the building.
29. **Fenders, &c.**—Fill in the fenders and over the trimmer arches with concrete; also to haunches of the arches.
30. **Chimney Pots.**—Provide 9in. drain pipes as chimney-pots, to stand 6in. above the top of brickwork, set and flanchied with plain tiles and cement.
31. **Limewhite.**—The walls of basement, except kitchen passages and breakfast room to be finished with a fair face, and twice limewhited, the colour to be fixed.
32. **Paving.**—The basement floors, not specified to be of wood, to be finished with Portland cement paying lin. thick, trowelled to a smooth face on 6in. concrete. The larder, scullery and cooler to be paved with 6in. square red tiles, bedded and jointed in cement on 6in. bed of concrete.
33. **Air Bricks.**—Provide and build in where directed No. 24 terracotta air bricks, 9 by 3, with short flues through walls.
34. **Ventilators.**—Provide and fix No. 8 Kite's patent ventilation inlet and outlet, 15s. p.c. each.
35. **Chimney-Pieces.**—The chimney-pieces in kitchen and scullery are to be formed in Portland cement, with jambs 9in. wide, and deal shelves 9in. wide and 1½in. thick, on proper brackets. Assist, when necessary, in fixing the chimney-pieces.
36. **Sink.**—Provide and fix in the scullery a glazed stoneware sink 3ft. 6in. by 2ft., on half-brick walls in cement.
37. **Generally.**—The bricklayer is to attend upon all other trades, to cut away when and where required, to point round plumbers' work, carefully stop putlog holes, examine brickwork throughout, and leave all brickwork and joints perfect. (Notes.)

#### EXCAVATOR.

Make a collection of the length of walls, and take by width and depth of concrete, which will give dimension of trench digging and concrete.

156.9	Dig and cart and concrete to
4.0	external walls.
1.6	

Then the odd walls and projections, casting up the squarings in each column so as to reduce the number of figures in the abstract, and we thus arrive at the dimensions, 1191'3 and 593'8.

Next take the same length :—

156.9	Dig and cart, part return, fill
4.0	and ram (followed by the other
1.0	walls as before).

Take the surface digging :—

50.9	Dig and cart to surface (and com-
41.3	plete the entire area of surface).
1.9	



Measure all the cement and tile pavings by the foot super., and take the filling-in under pavings by the foot cube.

EXCAVATOR, & C.		
Mem: For description of all materials, see specification.		
Cube. Dig and cart from surface.		
4117.7		
152yds. 14ft.		
Cube. Dig and cart from trenches.		
1191.3	Ddt.	
593.8	45.0	
214.8		
76.11		
2076.3		
45.0		
2031.3		
75yds. 6ft.		
	Do. part return fill and ram.	Ddt.
	957.1	30.0
	875.9	
	51.3	
	1384.1	
	30.0	
	1354.1	
	50yds. 4ft.	
Cube. Dry brick rubbish filled in, well rammed and levelled.		
351.7		
865.0		
1216.7		
45yds. 2ft.		

a current of air outside, or striking one slope of the roof, the plates cause a vacuum, and the foul air is drawn up and discharged. We

CONCRETE.		
Cube in foundations.		
1191.3	Ddt.	
593.8	45.0	
214.9		
76.11		
2076.7		
45.0		
2031.7		
75yds. 6ft.		
Supl. concrete 6in. thick, levelled under wood floors.		
943.9		
104yds. 8ft.		
	Do. under tile paving.	
	108.9	
	34.0	
	156.10	
	299.7	
	33yds. 3ft.	
Supl. Portland cement paving lin. thick, on and including bed of concrete 6in. thick, levelled to receive same.		
11.20		
10.26		
76.11		
219.5		
32yds. 3ft.		

Beattie and Son, and plans have been prepared (in competition) for another library—that of the solicitors to the Supreme Courts. The three great legal societies of Advocates, Writers to the Signet, and Solicitors will thus be each provided with its own library. The two former bodies have both been long in possession of the best collections in the country, and the public have always been generously allowed the use of them for any references, all that was required being a letter of introduction from a member. The site obtained is in the Cowgate, and any architectural display on the frontage of such a narrow street would be lost. Something, however, will be possible to make it out as a building of importance in treatment of the roof and upper story. About twenty-five plans have been sent in, and the assessors, Messrs. Burnet and Son, of Glasgow, have selected, as you mentioned last week, the design by Mr. J. B. Dunn, of George-street, Edinburgh.

The National Portrait Gallery continues, as it has done for months, to present the same unfinished aspect; but preparations are making to complete the building at its two extremities. The appearance hitherto has not been such as to give a very favourable impression of the architectural design, as an addition to the appearance of the street. It is impossible to get quit of the idea that, both in construction and proportions, it is only a huge warehouse, with a great monotony of arrangements in its windows and arches, unrelieved by any of the variety which is essential to a Gothic building of such magnitude. Probably this circumstance may have had the happy result of increasing the generous contribution of the donor, and the architecture of the finished whole will doubtless obviate, if not altogether, yet in some measure, the objections to what may be defined as the Noah's-Ark-like aspect of the work.

The large board schools in Torphichen-street and Johnstone-terrace are finished, or nearly so. They have both, and especially the former, been erected on sites somewhat awkwardly confined for such buildings; and the result has been happy, in as far as the architectural appearance of the exterior is concerned. Though a large number of these schools have been built, there is no sameness in the style, and the somewhat pronounced Gothic of the first board schools has been succeeded by a return to the Classic or Domestic style. The two schools just completing are very different, but each adapted with great skill to their position and neighbouring buildings. The interior of the Torphichen-street hall and staircases, which are finely lighted by cupolas, is imposing by its extraordinary length. The rooms on the side are *en suite*, and can all be opened from end to end. Shorland's school grate is generally in use, and great attention paid to the thorough lighting and ventilation of the crowded rooms.

The new buildings of the University will be now completed with the erection of the hall and tower, plans, in preparation by the architect, Dr. Anderson, being nearly ready for taking the usual estimates of the cost; this having been undertaken by Mr. McEwan, M.P., who has already given so largely to the scheme.

The Students' Union is well forward towards completion, and the view given lately in the BUILDING NEWS is a faithful representation of its character, the style being something between the French chateau and the Tudor castle. At present the principal front is buried somewhat by some adjacent buildings in Bristo-street, which should be swept away.

Edinburgh has had another added to the list of its statues in the monument recently erected to the late Duke of Buccleuch. It is on a larger scale and loftier pedestal than the others, and the site selected, near the west door of St. Giles Church, is in some respects an awkward one. The figure is admirably posed, from every point of view, and is, no doubt, an excellent likeness; but this unfortunately, is invisible, like all the bronze sculpture, till the sun lights up the surface which it does not do till the afternoon. The Duke is looking to the north, and turns his back on the southern border land, with which his name and that of his ancestors is most intimately associated. Possibly no other position could well be given to this statue; but there is less to be said in defence of the mistake which

Yd. ft. in.	£ s. d.	
153		Cube. Dig and cart from surface, not exceed 2ft. 0in. deep
75		Do. and do. from trenches
50		Do. and do. from do., part return, fill and ram
		Allow for all necessary planking and strutting
		Allow for any baling and pumping or temporary drainage to keep excavations free from water
45		Cube. Hard, dry brick rubbish filled in and well rammed and levelled
		No. 3. Fenders filled in with do. and do.
75		Cube. Concrete as described in foundations
2		Do., filled into haunches of arches and levelled for paving
105		Supl. Concrete 6in. thick, levelled under wood floor
33		Do., under tile paving prepared to receive same
		No. 11. Spandrels of trimmers filled in with concrete and levelled
32		Supl. Portland cement paving lin. thick trowelled to smooth face on and including bed of concrete 6in. thick levelled to receive same

Carried to summary.....

**CORRECTION.**—On page 36 I used the word "Blenkner" instead of "Bartholomew." It was the work of the latter which Mr. F. Rogers took as the basis of his book in 1873; but in a later edition (1886) the work was so entirely remodelled that very little of Bartholomew remains. I also ignored Dobson's "Student's Guide to Measuring and Valuing," which has been considerably improved by Mr. E. W. Tarn, M.A.

#### ROOF VENTILATION DURING SUMMER.

THE disfigurement caused by some forms of ventilators on the ridges of roofs has been one of the reasons why architects have not introduced these kinds of outlet more generally in buildings. As we have maintained, there is no reason why they should not be made to assist the sky line by inclosing the plates in well-designed turrets with good outlines. Cheapness has been detrimental to artistic ventilators of this class, and all kinds of inferior imitations are put up, more apologies than efficient exhausts. The "concealed roof ventilator," such as that patented by Robert Boyle and Sons, in which the deflecting plates are placed within the roof, with openings on each side just below the ridge, remove the objection to the external form, and, it appears to us, are particularly well suited for the nave roofs of churches. During the close summer season the evening services in our churches are very enervating, and in crowded town churches it is not unusual to see persons leave the service, and many ladies taken out in a fainting condition. The reason is not far to seek. It will be found that no means of outlet for the heated and vitiated air has been provided under the hot slates. The whole space of the open-timbered roof forms a receptacle for the respired air, which the open windows fail to remove. The vitiated atmosphere thus stored descends when the roof becomes cooled in the evening, to be rebreathed. The concealed roof ventilator is one of the simplest and least costly means of providing escape for this pent-up air, and when there is

should make it compulsory that every open-timbered church roof should be provided with two or three of these concealed ventilators, and then we shall have fewer cases of headache, lassitude during service-time, and of persons leaving the congregation from feeling faint, or from sheer inability to remain in a stifling atmosphere, or exposed to cold draughts from open doors and windows.

#### NOTES FROM EDINBURGH.

NO change for better or worse can be said to have marked the course of the half-year so far as the building trades are concerned. The city is still extending to south and west, the demand for suburban and semi-rural dwellings being apparently still unsatisfied. The desire for such residences, characteristic of the growth of modern towns everywhere, has doubtless had an immense impetus given it by the diffusion of the ordinary information and statistics of mortality in connection with sanitary matters, &c. The tendency to over-populate the towns and the depopulation of the country have made people naturally seek to escape from the evils of overcrowded districts, the noise and smoke and doubtful atmosphere of the city, to the suburban villa, with its garden ground and sky. The scheme is practicable for the ordinary householder only by reason of the great facilities of transit afforded by the rail and tramway. The mushroom-like rapidity with which such suburban buildings cover the ground, and the large proportion they bear to the compacter portions of the city, is very apparent to anyone from lower altitudes than that of Arthur Seat. At present the popular field for this emigration is, as for years past it has been, the southern and south-western districts. The outermost buildings of this extension are now climbing the slopes of Pentland range, and the distance from the business heart of the city must be measured by the mile. The district is credited with a much milder temperature than that of the valley lying northwards. But it has been ascertained that the average temperature of the neighbourhood of Stockbridge is only 2 degrees below that of Morningside, and the temperature of the higher lands on the south cannot fail to be affected by loss of the shelter from the east wind afforded by Arthur Seat and the Salisbury Crags. A splendid field for the speculative builder lies ready for occupation on the north, in the grounds mostly belonging to the Fettes Trust, where the air, whether the wind blows east or west, is always pure, from the mountains or the sea. The most of it is within wholesome, if not very easy, walking distance from the business centre of the town, and the northern tramways, when extended, will put it in respect of facilities of transit, on a par with the southern suburbs. There seems nothing impracticable in hoping for the time when blocks of country cottages, as well as country villas, may be a safe speculation for the suburbs.

The heavy under-building of the Free Library is making good progress under the hands of the energetic contractors, Messrs.



has been made in placing the Ramsay Memorial Cross so as to face the north, instead of in its natural and canonical position, facing east and west. The consequence is that the bronze sculpture on the shaft, which is the best part of it, is hopelessly illegible for the greater portion of the day; whilst the form of the monument itself—a Celtic cross—would have been seen from a much greater distance, and would have been more noticeable had the ordinary position been maintained.

The Buccleuch Monument, as a whole, has far too much stonecutting and filigree ornament in bronze work for a monument in the open street, and such a public thoroughfare. The stags couchant at the corner, &c., will run fearful risks if they are to survive another century. The whole is covered with bronze panels of incidents, historical and private, which only perplexes the spectator—not easily legible—and miniature racers, like good-sized rats, are chasing each other round the feet, giving the design far too much of the silversmith's trophy; in contrast with the simple and severe outlines of the principal figure.

Nothing very noticeable has been done in the way of alterations in the chief thoroughfare of the city. Extensive improvements, mostly internal, have been made on the Clarendon Hotel, and the Edinburgh, which had begun to look squat beside its loftier rivals, has overtopped them all by its late addition of a story and Mansard roof, with a huge *pièce de résistance* in the shape of a four-sided pyramid in slate surmounted by a flagstaff turret.

The negotiations for purchase of the gas companies have been successfully completed, after long discussion of the scheme, and the citizens, it is to be hoped, will have cheaper, if they cannot expect better, light. The water supply, though abundant, has not improved under the city management, and imperfectly constructed filters have not infrequently allowed water with much mineral and vegetable impurity to find its way into the houses. The impurity forces itself on the notice by green deposit on the water-bottles. People are even wishing for St. Mary's Loch, but probably the "fleas" and other insects of that source of supply might be no better, and less easily remedied as a nuisance.

#### AMERICAN SCHEDULE OF CHARGES.

THE American Institute of Architects have endorsed the schedule of professional charges adopted by the Western Association of Architects, which will be found to agree in the main with that adopted by English architects. The following is the text:—For full professional services, including supervision, the commission is five per cent. upon the cost of the work. The charge for partial services is as follows:—Preliminary studies, 1 per cent.; preliminary studies, general drawings, and specifications, 2½ per cent.; preliminary studies, general drawings, specifications, and details, 3½ per cent. For works that cost less than 10,000 dollars, or for monumental and decorative work and designs for furniture, a special value in excess of the above; for alterations and additions, an additional charge to be made for surveys and measurements; an additional charge to be made for alterations and additions in contracts and plans, which will be valued in proportion to the additional time and services employed; necessary travelling expenses to be paid by the client. Time spent by the architect in visiting for professional consultation and in the accompanying travel, whether by day or night, will be charged for, whether or not any commission either for office work or supervising work is given. The architect's fees are successively due as his work is completed in the above classifications. Until an actual estimate is received the charges are based on the proposed cost of the works, and the payments are received as instalments of the entire fee, which is based upon the actual cost. The architect bases his professional charge upon the entire cost to the owner of the building when completed, including all the fixtures necessary to render it fit for occupation, and is entitled to additional compensation for furniture or other articles designed or purchased by the architect. If any material or work used in the construction of the building be already upon the ground or come into possession of the owner without

expense to him, the value of said material or work is to be added to the sum actually to be expended upon the building before the architect's commission is computed. This regulation of the charges is generally followed in England; the schedule adopted here does not define what is reasonable for preliminary sketches, which is left to the architect in each case. We shall be glad to hear how the schedule adopted by the Western Association is found to work in actual practice.

#### UNIVERSITY COLLEGE, LONDON.

##### CLASSES IN ARCHITECTURE.

THE following prizes and certificates have been awarded:—

Fine Art: Donaldson Silver Medal, E. A. Runtz, of London. Certificate, 2, Alan C. Walker, of Tasmania. 3 and 2nd Prize, Harold R. Luck, of London. Second Class: B. F. Fletcher, of London; J. W. Little, of London; P. D. Smith, of London. Third Class: M. A. Green, of Bath; E. A. Williams, of Upper Norwood; F. E. Williams, of London. Construction: Donaldson Silver Medal, Horace Helsdon, of London. 2nd Prize, Harold R. Luck, of London. Certificates, 3, Alan C. Walker, of Tasmania. 4, Wm D. Claridge, of London. 5, J. W. Little, of London. 6, J. Borrowman, of Godalming. Second Class: A. W. Carne, of St. Agnes; M. A. Green, of Bath; E. C. Hanson, of London; H. C. Lander, of London. Third Class: A. Sealy-Allin, of co. Cork; E. Finch, of Southampton; A. G. Turner, of Anerley; E. A. Williams, of Upper Norwood; F. E. Williams, of London. Modern Practice:—Prizes, equal: Gordon P. G. Hills, of London; Alan C. Walker, of Tasmania. Certificates, 3 equal, Harold R. Luck, of London; Oscar Oertel, of London. 5, E. A. Hellicar, of Bromley. Second Class: E. A. Williams, of Upper Norwood. Third Class: M. A. Green, of Bath; H. Lazarack, of Aldershot; W. W. Wilson, of Leytonstone.

Professor Roger Smith's prizes for drawings illustrative of the work of the classes were awarded as follows:—Fine Art Prize divided between E. Runtz and A. C. Walker; Construction Prize divided between John Borrowman and H. C. Lander.

#### COMPETITIONS.

EDINBURGH. — CHAMBERS MEMORIAL STATUE.—The report by Mr. Brook, A.R.A., the assessor on the designs for the Chambers memorial statue, has been adopted by a committee of the Edinburgh Town Council. The awards are as follows:—1, "Nothing Hazard Nothing Have," by Mr. John Rhind; 2, "St. Columba," by Mr. W. Birnie Rhind; and 3, "Fiat Justitia," by Mr. J. Massey Rhind. In the successful model, the right hand rests on the thigh and holds back the civic robe, while the left comes in front to support, on the upper half of the left limb, the municipal cocked hat. The pedestal exhibited shows panellings with symbolical figures of "Perseverance," "Industry," "Liberality," and "Literature." It is suggested that it should be in red Corsehill freestone, with granite steps. If it is wished to be in granite, the details could be modified. The conditions of the competition, it will be remembered, were that the author of the design judged first in order of merit was to be employed to carry the work into execution; and premiums of £50 and £25 are to be awarded to the authors of the designs judged second and third in merit respectively. The pedestals of the three statues of Messrs. Rhind have been executed from designs prepared by Messrs. Blanc and Gordon, architects, George-street, Edinburgh.

#### CHIPS.

The Morecambe Local Board having applied to the Local Government Board for sanction to borrow the sum of £9,000 for works of promenade and street improvements, &c., Major-General C. Phipps Carey, R.E., Inspector for the Department, held an inquiry into the subject-matter of the application on Wednesday.

Alterations and repairs are now proceeding at St. Luke's Church, Wolverhampton, comprising structural alterations, heating with low-pressure hot-water pipes, and ventilation. The whole of the works are being carried out under the superintendence of Mr. Joseph Lavender, A.R.I.B.A., of Wolverhampton, who has adopted Messrs. C. Kite and Co.'s system of concealed roof ventilation.

The western end of the parish church of St. Mary, Bridgwater, was reopened on the 12th inst. after having been opened up and renovated. The total cost amounts to £1,200. The architect was Mr. Geddings, and Messrs. Trask and Sons, of Ilminster, were the builders.

#### ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The annual general meeting of this association was held on the 5th inst., in the Architectural Hall, George-street, Mr. Hippolyte J. Blanc, president, in the chair. The secretary (Mr. T. Fairbairn) submitted the annual report, which contained the record of a year of successful work by the association. During the year the association had added 34 members to its roll, while the withdrawals had been considerably less. The treasurer (Mr. Whitelaw) submitted the financial statement, which showed a balance in favour of the association amounting to £146, compared with £170 last year. It was explained, however, that there had been £36 of extraordinary expenditure on account of the furnishing of the new hall and additions to the library, so that the association was financially in as good a position as last year. Reports submitted on behalf of the sketchbook committee by Mr. Gordon, and the work class committee by the President, indicated continued success. In the work class there had been 23 students, whose work, and the quality of it, showed an advance on the previous year, and prizes gained at the class, and in connection with the sketchbook competition, were presented in the course of the evening. Professor Baldwin Brown was elected president for the ensuing year, with Mr. Blanc as past-president; Mr. John Kinross and Mr. Archibald Macpherson were appointed vice-presidents. Mr. T. A. Fairbairn was continued in the office of honorary secretary, and Mr. A. D. Fairbairn was appointed treasurer. The retiring president then delivered his address, in which he reviewed the work of the session. In speaking of the work classes, he pointed out how invaluable these were as a supplement to the work of the office; and he thought it was a matter of credit that with so little encouragement so much was being done, and so well. The number of students attending the classes was increasing, and they were a fit subject for special effort to secure external help for their endowment. The other leading topic in the address was the subject of registration, and Mr. Blanc argued that the architect could not be brought to the level of test examination. There were, doubtless, minor qualities which went to make up the architect which could form the subject of academic test, but registration could not invest the constructor in the garb of an artist. Architecture should be free, if it would have a healthy, vigorous growth, and in that view it seemed unnatural to make it a close profession. In closing, Mr. Blanc spoke of the greatness of the architect's profession, which had raised monuments which time itself seemed powerless to destroy. It was fortunate that the art was being fostered again under somewhat favoured conditions; for there was an increasing section of the community which had risen to a sense of healthy artistic feeling which was daily increasing. It was for them accordingly to enlarge that appreciation through the means of their profession.—On Saturday last, the association had their annual excursion, the locality selected being the East Neuk of Fife. There was a large muster of the members of the association and their friends, and the party, after reaching Leith, proceeded by steamboat to Elie, from which point the journey was continued in conveyances to St. Monan's Church, where they were received by the Rev. Mr. Turnbull. Notes were read by Mr. Hippolyte J. Blanc, on the edifice, which was described as an example of the "Middle Pointed period" of Gothic work in Scotland. Its foundation, it was explained, was attributed to David II. in 1369. It had become ruinous during the 18th century, but had been restored to its present condition in 1828 by the late William Burn, architect. The edifice consisted of choir and transepts, without nave, and central tower and steeple. The company resumed their drive to Abercrombie Church, a simple rectangular building, with any features remaining quite obscured with ivy. The antiquity of the edifice was, however, as Mr. Blanc explained, verified by scattered pieces of carved stones in the patched-up ruin. Balcaskie Castle was next reached, and was described by Mr. Blanc as a fair type of the average mansion of the 18th century. On Kellie Castle notes were read by Mr. Lorimer.



## Engineering Notes.

**CONCRETE WORKS AT ABERDEEN HARBOUR.**—Mr. Philip J. Messent, M.Inst.C.E., Tyne-mouth, submitted a report on Tuesday to the Aberdeen Harbour Commissioners on the quay walls and the repairs which have just been completed in the graving dock. He states that the concrete in the walls, from 11½ ft. below to about 3½ ft. above low water, was executed and deposited on what is termed the "plastic system." This mode of using concrete is of comparatively modern introduction, and is, Mr. Messent says, at variance with the long-adopted practice of engineers and their opinion that cement, concrete, or mortar, when it had once commenced to set, was injured or deteriorated by being disturbed, and was so prevented from ever attaining strength, such as it would have attained had it been undisturbed. In a paper by the author or inventor of the system describing certain experiments, he says that they "show that 3½ to 1 concrete, after setting out of water for 18 hours, and then rammed into moulds, will form a monolithic mass when afterwards placed in water; but the strength of this mass will very much depend upon the time allowed for setting before deposition. If only eight hours elapse between mixing and deposition, there is practically no reduction in strength, but with a longer interval the strength is gradually reduced, until, at about 18 hours, it is little more than one-half." Mr. Messent's experience is not confirmatory of the above, and he believes that a considerable reduction in the strength of concrete will result if even less "than eight hours elapse between the mixing and deposition." The engineer states that it appears probable the submerged portion of the wall has not suffered from the chemical action of the sea, but he regrets that this most probable assumption has not been indisputably verified by chemical analysis.

## Building Intelligence.

**ESSENDINE.**—The curious and interesting little Norman church at Essendine was reopened on Friday, after restoration under the supervision of Mr. Traylen, diocesan architect, Stamford. The church, which is built within the precincts of what was once a double-moated castle, consists of chancel and nave and turret with two bells, and is a small building. It was repaired in 1835 and 1845. The most ancient part about the church is the south doorway, of the time of Henry I., the tympanum of which contains three carved figures—our Saviour, with His left hand resting on a book and the other raised in the attitude of benediction, and on each side of Him angels, with hands lifted in the attitude of worship. On the right hand of the central figure are the letters "I.H.C." The jambs of the door are also richly carved: there are monkeys beneath a tree, an owl, a stag, and other figures nearly effaced. Drawings of the doorway have often been made, and it is illustrated in the *Glossary of Architecture*. There is also some Norman carved work placed horizontally over the north door. The chancel arch is curious: it contains Norman details, but the arch itself is pointed. The present work comprises the lowering of the floors of the nave and chancel a foot, paving with stone in the passages and with wood block flooring under the seats, removing a buttress at the west end, opening out a narrow lancet Early English window which had been blocked up thereby, taking down the entire west wall with the belfry, and rebuilding it stone for stone with its characteristic double bell gable. Faint traces of painted decoration were found on the ancient plastering, which have been preserved. The ground at the west end has been lowered about 3 ft. The old square box pews have been cleared away, and new seats provided. The font has been placed on a step, and the old cover cleaned and replaced. The stonework of the windows and arch has been removed, and new woodwork to the north and south doors provided. An organ has been built by Messrs. Bishop and Son, of London. Mr. John Spurr, of Belmistrorpe, has done the general builder's

work in the church, and Mr. Fenn, of Ryhall, executed the woodwork.

**LONDON SCHOOL BOARD.**—At the meeting last week of the Board a heated discussion arose on a statement by Mr. Gover that another member, Mr. Helby, had stated that "matters were quite as bad, or worse, at the School Board than at the Metropolitan Board of Works." Mr. Helby, in justification, stated that if Mr. Gover had looked into the matters before the Works Committee he would have found that the ratepayers had, through the Board, paid for what they had not received in the matter of foundations to school buildings. He did not mean to say that this was attributable to members of the Board, and he did not impugn the honour of members of the Board; but he said that those who took the position of membership of the Board should watch over the interests of the ratepayers, and if they had all taken the interest in the Board's work thousands of pounds would not have been paid without value being received for the payment. Mr. Gover moved that a special committee be appointed to investigate any allegations of corruption affecting any member or officer of the Board and report. This was carried by 21 to 10 votes. Mr. Bousfield moved, as chairman of the special committee on the work of the works department—"That, in the opinion of the Board, the late architect of the Board is responsible for the absence of proper foundations at the Brand-street School, Ratcliff (Tower Hamlets), and that he be called upon to make good the loss arising therefrom." This was carried by 17 to 10 votes.

**MAPPLEBOROUGH GREEN, STUDLEY.**—The Church of the Holy Ascension was recently opened by the Lord Bishop of Worcester. The church has been erected at the cost of Mr. William Jaffray, in memory of his wife. The building, which is from the designs of Mr. J. A. Chatwin, of Birmingham, and has been erected under his superintendence, is Early English of the purest type. It consists of nave, 48 ft. 8 in. by 21 ft., and 40 ft. high; chancel, 32 ft. 6 in., and 36 ft. high; north and south aisles, 48 ft. 8 in. by 6 ft.; and north and south chancel aisles, each 15 ft. by 10 ft.—that on the north being an organ chamber, and that on the south a memorial chapel. At the west end is a tower, 21 ft. in the square and 70 ft. high, with a belfry turret on the north side. The entrance is by a deep oak porch on the south side, closed by an oak door, with floriated hinges in wrought iron. The materials of the building are Bromsgrove stone for the exterior, and for the interior Hasbury stone, with Bromsgrove stone dressings; the space between the walls being filled with concrete, in which a so the floor is bedded. The woodwork throughout is of oak. The roofs are tiled. The nave is divided into four bays, with circular and octagonal columns, alternately, having moulded caps and bases. The aisle windows have traceried heads. The roofs of the nave and aisles are trussed and rafted; in the aisle roofs the principals rest upon bracket corbels, and at each end the nave arches are finished with string courses terminating in carved corbels. The sitting spaces in the nave—to receive 120 chairs—are laid with wood blocks; the rest of the floor throughout is of red Ruabon tiles, with a narrow edging of black tiles. The aisle windows are filled with cathedral glass. The chancel is separated from the nave by a low stone screen, enriched with a band of carved work; at the north side of the screen is placed the pulpit, which is of oak open work, decorated with carving, and resting on a stone base, forming part of the chancel screen. The chancel is raised three steps above the nave, the sacrum rises again three steps from the chancel floor. On each side of the chancel are oak stalls, with carved ends, for clergy and choir. On the south, by the side of the altar, are sedilia and a credence table, with piscina, recessed into the wall. The east window is a triple lancet, and filled with stained glass, the subject being the Passion of Our Lord. The east window of the Memorial Chapel is also filled with stained glass, illustrating the text "Now abideth Faith, Hope, and Charity, these three; but the greatest of these is Charity." These windows, designed by Mr. John Powell, were made by Messrs. Hardman and Powell, who have also executed the metalwork in the church. The carving in stone

and wood has been executed by Mr. R. Bridgman, of Lichfield, and the organ is the work of Messrs. Nicholson and Co., of Worcester. The builders are Messrs. John Smallwood and Sons, of Wootton Wawen.

**NEWCASTLE-ON-TYNE.**—Services in connection with the dedication of the new building which has just been added to St. Matthew's parish church, Summerhill-place, Newcastle, and the reopening of the church after enlargement have just taken place. The building is of unusual plan and arrangement. It stands on an awkwardly shaped piece of ground, which will be almost entirely covered when the church is completed. It consists of chancel and nave, under a continuous roof, with western tower, and two aisles on each side of the nave. The Bishop of Durham, in consecrating the church in 1880, described it as "a fragment." At that time the only permanent roof was that over the sanctuary, and although four of the pillars were built, they supported a roof of the commonest and most temporary character. Two years ago the contract was signed for the work now completed. This comprises the construction of aisles and clerestories, on each side, and the making of the permanent roof, all of which was done from the outside, while the regular services in the church proceeded without interruption. When the work was completed, the dividing walls were taken down, and the old and new portions joined together; and during the few weeks that this has occupied the church has been closed. The whole lower stage of the tower is built coming out to the street. The west window is of five lights, with tracery, and on each side there is a continuous clerestory of twelve two-light windows, and a second clerestory to the inner aisle. The font stands elevated on marble steps in the centre of the base of the tower, and a dwarf screen of stone has been put up to enclose the western end of the chancel. The western bays of the aisles still remain to be built before the ground plan of the church is completed, and the upper stages of the tower are also required. The works have been done by Mr. F. Caldcleugh, of Durham, under the personal supervision of the architect, Mr. Robert J. Johnson, of Newcastle.

**NEWCASTLE-UNDER-LYNE.**—The foundation stone of the new public buildings in the Ironmarket, comprising free library, a splendid assembly-room, council chamber, and municipal offices, and a school of art was laid on Friday. A competition of architects for supplying the designs of the new buildings ended in the plans of Messrs. Sugden, of Leek, and Blood, of Newcastle, being accepted conjointly with those of Messrs. Chapman and Snape, of Newcastle. The contract of Mr. J. Gallimore, of Newcastle, has been accepted for the erection of the buildings at £12,000, but the total cost, including site, will probably be nearer £14,000. The plans show an edifice of Renaissance character: the Ironmarket front, where stone dressings abound, being—with its tower—treated in sympathy with severer Classic precedent; whilst the other portions of the structure, which are entirely in brick, relax into the quainter handling seen in Flemish towns. The council chamber will be on the ground floor, 38 ft. wide, 50 ft. long, and 18 ft. high. It has three embayed recesses, each containing a wide window of three compartments with window seat, divided from each other by the pillars under the colonnade above. At each end of the room is a richly-decorated fire-place, displaying in its overmantel the arms of the borough. The free library is about 24 ft. wide, 40 ft. long, and 33 ft. high, lighted from the roof and by a three-light window in the north end. It has light iron galleries every 8 ft. or so in height, connected by spiral stairs, dispensing with long ladders. The general newsroom and the reference reading-room are each 25 ft. wide, 30 ft. long, and 16 ft. high. In the basement an area is secured for storage of newspaper files, unbound magazines, patent specifications, and blue books. The school of art rooms are obtained in the lower ground stories. The elementary and antique schools are each 25 ft. by 30 ft., and the lecture hall (with art master's stores) is 24 ft. by 44 ft. Including the stage or orchestra, the full dimensions of the assembly-room are—length, 100 ft.; width, 50 ft.; and height, 25 ft. It is lighted from the top, so securing uninterrupted wall space for picture



exhibitions, &c. The ceiling is deeply coffered in plaster work, with a deep cove bringing it down to the walls, into which are groined a number of small windows. The main entrance to this hall (which is on the first floor) is by a wide double staircase of stone, with wrought-iron lamps and palisadings. The floors throughout are fire-proof, of cement concrete, supported by British steel girders and joists, from the works of Messrs. Dorman, Long, and Co., of Middlesbrough. Most of the floors are to be laid with wood blocks on his patent system by Mr. Roger Lowe, of Farnworth. The bricks are all made by Mr. Platt, of Newcastle, those for facing the exterior being thin ones, laid in with mortar. The stone is chiefly from "Beggars Well" Quarries, near Alton, the more exposed parts from the Roches beyond Leek. The carving is being done by Mr. Millson, of Manchester, and the clerk of works is Mr. Pattison, the borough surveyor.

STOKE ST. GREGORY.—The parish church of Stoke St. Gregory, near Taunton, was reopened on the 12th inst., after undergoing restoration. The tower has been freed from plaster and pointed. The arch at the east end of the north aisle has been reopened and rebuilt, as well as the pier on the nave adjoining. A piscina has been brought to light in the south wall of the chancel, and another in the east wall of the north transept, where also two doorways have been reopened, as well as the north doorway in the north aisle. The 15th-century wagon-headed roof of the nave has had the plaster removed from it, and the timbers have been repaired. The roof of the north transept has been repaired, and oak boards substituted for plaster. The south transept has been covered with a new roof of oak, and a new floor and joists have been placed in the church. The modern reredos has been relieved by carving and columns of red sandstone. The architect was Mr. J. Houghton Spencer, of Taunton; and the builder Mr. H. J. Spiller, of the same town. The cost has been about £900.

#### CHIPS.

The summer meeting of the Westmoreland and Cumberland Archaeological and Antiquarian Society was held at Kendal on Wednesday and Thursday in last week. On the former day the party assembled in the town hall, Kendal, where they were welcomed by the Mayor (Mr. Titus Wilson), who is the secretary to the society. Several papers were read. On Thursday the members visited Shap and Penrith.

At the meeting of the Leeds School Board, Messrs. Kelly and Birchall were appointed architects for the Bramley school extension, at a remuneration at the rate of 4 per cent. on the contracts, this to include all charges for plans, quantities, and supervision.

Mr. E. H. Shorland, of Manchester and London, has recently supplied his Manchester grates and Manchester stove, amongst other places, to the following post-offices:—Buckingham post-office, Amptill post-office, St. Leonard's-on-Sea post-office, Guildford post-office, Southampton post-office, &c.

The new railway line from Sutton-on-Sea to Mablethorpe, completed a fortnight since by the contractor, Mr. James Dickson, of St. Albans, has been inspected by Major-General Hutchinson, on behalf of the Board of Trade. The opening took place on Saturday last. The line is a single one, is in length 2 miles 57 chains, and has been constructed by the Sutton and Willoughby Railway Company, the cost being about £10,000.

Additions have been made to the fittings of Berkhamstead Parish Church in the form of a rood cross for the chancel screen, the first portion or framework of the screen, and communicant's rails to the altar in St. Katherine's Chapel. The cross stands over the centre of the chancel gates. It is nearly 6ft. in height, is of English oak, and is worked on both faces, the edges being moulded with conventional leaf ornaments. Towards the nave are medallions containing the emblems of the Passion, with an "Agnus Dei" in the centre. The cross was designed by Mr. C. H. Rew, M.S.A., and the work was executed by Mr. H. Hems, of Exeter.

In the annual competition for measured drawings held in connection with the Edinburgh Architectural Association, the first prize has been awarded to Mr. R. S. Lorimer for measured drawings of Kellie Castle, Fife, including drawings of the elaborate plaster ceilings of which the castle contains many interesting examples.

#### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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## Correspondence.

#### GLOUCESTER BATHS COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—Is this yet another to be added to the long list of unsatisfactory public competitions? It appears so, by your recent notices of proceedings with regard to it.

The committee in their Instructions asked for certain accommodation, but also stated the price they were willing to pay, irrespective of its being unobtainable for the money. This, I know, was clearly pointed out to them by at least one competitor (who has had experience in this class of work), and in his report it was distinctly mentioned as impossible to give the accommodation for less than £8,000; and the tenders obtained for carrying out the first premiated design have fully proved the correctness of his statement.

I should like to ask, in fairness to all the competitors whose designs were rejected owing to their estimate being above £6,000, what the committee intend to do to remunerate them for their loss of time and trouble? If the first premiated design, estimated to cost £5,680, is tendered for at £8,000, and which the committee

do not seem able to reduce below £7,500, by the same rule the second premiated will cost about £9,000. Have the authors of either of these designs had any practical experience in such work before?

I examined all the designs for some three hours when on exhibition, and certainly my award would not have agreed with the referee's, neither can I see on what basis the referee calculated his estimate of cost of the design he recommended for acceptance. Did he go into this question at all? If not, how could he make such recommendations with the committee's Instructions before him?—I am, &c., A COMPETITOR.

#### A CASE FOR THE S.P.A.B.

SIR,—I inclose a cutting from *Glasgow Herald* of 11th instant. This seems to be a matter in which the Society for the Protection of Ancient Buildings might well interfere.

KIRKCUDBRIGHT.—The authorities have resolved to erect a new gateway to the extended churchyard, and a suggestion has been made that the pillar stones be taken from Dundrennan Abbey. The present gateway was erected in 1644, the pillars being of stone from the Abbey ruins.

Dundrennan Abbey is one of our finest Scottish abbeys, and from a personal knowledge of it, gained on a sketching-tour last year, I am convinced that much harm and no good must result to it from such action as is contemplated by the authorities of Kirkcudbright.—I am, &c.

JAMES K. HUNTER.

46, Newmarket-street, Ayr, July 17.

## Intercommunication.

#### QUESTIONS.

[9687.]—Strains.—I can understand the formula—

$$Z \times \frac{y}{2} = W \times l$$

or—

$$Z = \frac{2Wl}{y}$$

in the first column on page 6 of current volume of the BUILDING NEWS; but I fail to comprehend that following figure 3 in second column on the same page, which reads—

$$Z \times \frac{y}{2} = W \times \frac{l}{2}$$

or—

$$2 = \frac{4Wl}{y}$$

Should it not be—

$$Z \times \frac{y}{2} = W \times \frac{l}{2}$$

or—

$$Z = \frac{2Wl}{2y}$$

—W. J. P.

[9688.]—Sewers and Sewage.—1. Is there any way to gauge the flow of a sewer when the fall is unknown than by means of an instrument? 2. What advantages and disadvantages temporary and structural has concrete in comparison with brickwork in the construction of sewers in a large town? 3. What chemicals are used in the treatment of sewage, and how are they applied?—SANITARY.

[9689.]—Shaky Floor.—The floor is of yellow battens 6in. by 2in., 13ft. bearing, and disagreeably shaky. What can I do to stiffen it with as little disturbance as possible of the floor-boards over, and the lath-and-plaster ceiling and cornice under?—W.

[9690.]—Architects' Charges.—When an architect has arranged for drawings, specifications, and superintendence at so much per cent., and for quantities at an additional percentage specially with the proprietor, is he, the employer, justified in not allowing for quantities, having employed his own men and two contractors to do the carpenters' and joiners' work, and let other trades, such as painting and gas-fitting, without the intervention of the architect, thus depriving the latter of his quantity money, as stipulated, and in the case of painting, deferring the letting apparently for the purpose of saving the architect's commission altogether?—FAIRPLAY.

An Imperial order has been issued by the German Government directing the special committee appointed by the late Emperor Frederick to study the question of erecting in Berlin a new cathedral worthy of the Prussian capital to commence its labours forthwith.

The Duke of Cambridge will, on August 10, unveil the memorial which the Corps of Royal Engineers are placing in Rochester Cathedral in memory of the late General Gordon and the officers and men who fell in the Relief Column to Khartoum.

The trustees of the Centenary Wesley Chapel, Camborne, have instructed Mr. Oliver Caldwell, M.S.A., of Penzance, to prepare drawings and specifications for the reseating, enlarging, and altering the above chapel, as well as renovation and decorating.



## LEGAL INTELLIGENCE.

**ELECTRIC LIGHTING.—IMPORTANT DECISION.—**EDISON AND SWAN UNITED ELECTRIC LIGHT COMPANY (LIMITED) V. HOLLAND AND OTHERS.—(Chancery Division).—This action was brought by the plaintiffs, the Edison and Swan Company, to restrain the infringement by the defendants of two patents—(1) the Edison No. 4576, obtained in 1879, for the incandescent lamp; (2) the Cheesbrough patent, No. 4874, 1878, amended in 1884, for a mode of making uniform the carbon thread, which forms the light-giving portions of the lamp. The defendants were Mr. William Holland, the manager of the Albert Palace; the Jablochkoff Company, and the General Electricity Company, who supplied the installations, and the Anglo-American Brush Company, who supplied the lamps. The Attorney-General (Sir R. Webster, Q.C.), Mr. Aston, Q.C., Mr. Moulton, Q.C., and Mr. Bremner appeared for the plaintiffs; Sir Horace Davey, Q.C., Mr. Finlay, Q.C., and Mr. J. C. Graham appeared for the defendants. Mr. Justice Kay said, on Monday last, that, after careful consideration of the evidence, he came to the conclusion that the Edison patent, No. 4576, taken out in 1879, was invalid, and that the Cheesbrough patent, No. 4874, taken out in 1878, and amended in 1884, was valid. He therefore, as to Edison's patent, dismissed the action with costs; and as to Cheesbrough's patent, granted an injunction, with costs, the costs to be on the higher scale, and to be set off against one another, the costs in the Cheesbrough case to be as between solicitor and client.

**BAD MORTAR.**—George Ford, a builder, was summoned at Hammersmith Police-court on Friday for using materials in the construction of two houses in Abdale-road other than mortar. Mr. Knightley, the district surveyor, produced a sample of the mortar, and said it contained earthy matter. Mortar should be composed of fresh-burnt lime and clean, sharp sand, without earthy matter, in proportion of one of lime and three of sand or grit. He had remonstrated many times, but without effect. He took the sample from the lower part of the wall, and it contained about 50 per cent. of earthy matter, probably garden mould. Mr. Curtis-Bennett made an order for all the work up to a certain day to be pulled down, and the defendant to pay three guineas costs.

**THE "PROPER REMUNERATION" OF AUCTIONEERS.—**IN RE WALFORD—WALFORD V. WALFORD.—In this case, tried in the High Court of Justice, Chancery Division, before Mr. Justice Kay, his lordship made some important observations on the right asserted by auctioneers to settle among themselves the scale of their remuneration for sales of estates, and to exact charges under that scale from the persons who employ their services. As will be seen, all they are strictly entitled to, beyond expenses for outgoings, is a "proper remuneration," according to the scale allowed by the Court in sales of property under its control. The action was for the administration of an estate of the late Mr. Cornelius Walford, who died in 1885, having by his will disposed of real and personal estate to a considerable amount. His will contained provisions (which, however, failed) for establishing an institution to be called "The Walford Chronological Institute," also for the preservation in suitable rooms of his accumulations of literary matter, and his silver testimonials presented to him by the American journalists in 1874. The testator's real estate was subject to a mortgage to certain persons for £3,000. Subsequently to the judgment in the action the mortgage was, with the consent of the Chief Clerk, transferred to certain other persons, who were to sell the property under the power of sale, it being represented to the Chief Clerk that, under the particular circumstances of the case, a sale by the transferees would be a more economical way of effecting a sale. The property was then, upon the instructions of the transferees, put up for sale by auction by Messrs. Beadel and Co., the well-known auctioneers; but owing to the reserve price, £7,000, not being reached, it was not sold. Subsequently, Messrs. Beadel sold the property by private contract for the reserve price. On the mortgages bringing their accounts of the sale before the Chief Clerk in the usual way, he allowed the auctioneers only the charges usually allowed in cases of sales in Court, and struck £62 10s. off the charge in their bill for commission. The action now came on for further consideration, together with a summons by the mortgagees, to vary the chief clerk's certificate by restoring the £62 10s. he had disallowed. Mr. Renshaw, Q.C., and Mr. B. B. Rogers, for the applicants, the mortgagees, contended that the auctioneers' charges ought to be measured by the scale prevalent among and acted upon by auctioneers in cases of sales by free owners, and not by the scale adopted in cases of Court sales. Mr. Justice Kay, after stating that he had seen the Chief Clerk upon the matter since it was last before the Court, said that the Chief Clerks, not only in his Chambers, but

also in the Chambers of the other Judges of the Chancery Division, had agreed to settle what they considered a proper remuneration to auctioneers for doing that which the auctioneers in the present case had done. There had been an attempted sale by auction, and the sale not being effected, the auctioneers afterwards sold by private contract to a purchaser. There was in his Lordship's Chambers a regular fixed scale of charges upon which auctioneers were remunerated for work of this kind. His lordship had heard with the greatest surprise that auctioneers had agreed among themselves to fix a certain scale of remuneration upon which they chose to charge the persons who employed them. They had no more right to do that than any other body of persons in the kingdom; and his lordship hoped that no judge would allow auctioneers more than their proper remuneration merely because they had agreed among themselves to charge more. For his own part, his lordship would not recognise any such arrangement. In his opinion, the Chief Clerk was perfectly right, and had allowed to the auctioneers in this case quite as much as they ought to have. Besides the amount of remuneration, the auctioneers had been allowed a sum for various outgoings, and yet they had charged about £130 for commission alone. The Chief Clerk was quite right to disallow the £62 10s., and therefore the application must be refused, with costs.

## WATER SUPPLY AND SANITARY MATTERS.

**MILTON, BURSLEM.**—Mr. S. J. Smith, C.E. one of the inspectors of the Local Government Board, held an inquiry at the Board schools, Milton, on the 12th inst., with respect to an application by the rural sanitary authority of the Wolstanton and Burslem Union for the sanction of the Local Government Board to their raising a loan of £900 for works of sewerage and sewage disposal at Milton. Mr. J. Lowndes, clerk to the rural sanitary authority, explained that he had obtained a portion of the Abbey Farm, containing nearly 8½ acres, as a site for a sewage farm. The scheme of sewerage proposed would deal with 284 houses, comprising a population of 1,420. The assessable value of the district was £7,303. Mr. G. B. Ford, surveyor to the authority, submitted plans of the proposed scheme, and the inquiry terminated. Mr. Smith subsequently inspected the proposed site of the irrigation works.

**YORK.**—At a special meeting of the York City Council held on Monday, the adoption of the joint report of the Streets and Buildings and Sanitary Committee, embodying the revised sewerage scheme for the city, drawn up by Mr. Mansergh and the city surveyor (Mr. Mawbey), was carried. Mr. Tripp considered it a matter for congratulation that the original estimate of £106,000 should have been, with the assistance of the city surveyor, reduced to £93,000. Alderman Agar moved that the salary of Mr. Mawbey, city surveyor, be increased from £350 to £500 per annum, and commented on the valuable services Mr. Mawbey had rendered in connection with the sewerage scheme. Sir J. Terry seconded the motion. Mr. Dickinson moved and Mr. Mann seconded, as an amendment, that Mr. Mawbey's salary be increased from £350 to £400 per annum, the question of salary for services rendered in connection with the new sewerage works to be referred to the joint committee for further consideration. Ultimately the amendment was lost, eight voting for it and twenty-five against.

## STATUES, MEMORIALS, &amp;c.

**WALSALL.**—During the past week another step towards the completion of the statue of Sister Dora has been taken, the three reliefs which Mr. F. J. Williamson, of Esher, was commissioned to produce having been put in position in the pedestal under Mr. Williamson's personal superintendence. They are in white marble, and in high relief. The first panel represents the tyure explosion at the Birchills Furnaces 14 years ago, with Sister Dora directing the removal of some of the injured men, and the blast furnaces forming the background. The second represents one of the hospital wards, with Sister Dora tending an injured man, the doctor being on the other side of the bed and a sister at the foot. The third represents the children's ward at the hospital, with Sister Dora seated, holding a child on her knee with one hand and with the other touching a cradle by her side, a couple of convalescent children being at play at her feet, and the late Mr. S. Cox being seated in the background.

The Dewsbury Town Council have decided that electric light shall be adopted for the lighting of all the rooms in the new town hall, and Mr. William Hartnell, of Leeds, was appointed to make a complete installation, at a cost of £2,000.

## Our Office Table.

So the reredos at St. Paul's Cathedral is to be brought into the law-courts, after all. Sir Henry James last Friday obtained from the Queen's Bench Division a rule *nisi* calling upon the Bishop of London to show cause why a mandamus should not be issued against him to compel him to hear the case against the alleged superstitious and idolatrous figures; but the Court did not seem to be of opinion that after the Bishop had been heard, it would order an ecclesiastical trial. Lord Coleridge told Sir Henry James that he might take a rule if he pleased, but that he was to hold himself responsible for the results. This is an evident indication on Lord Coleridge's part that he believes in the episcopal veto.

The employes of Messrs. Jones and Willis, church furnishers and art workers in metal, wood, and stone, to the number of 200, and representing the various sections of their works in London and Birmingham, met at Oxford on Saturday, the 7th inst., for their annual picnic. After a round of visits to numerous colleges and public buildings, the party proceeded by steamer from Folly Bridge to the Isis Hotel at Ifley, where, after dinner, a cricket match between the two branches of the firm, and a programme of sports were decided. The remainder of the day was occupied in other outdoor amusements, boating, quoits, &c., and, after a most enjoyable time, the party went back to Oxford. About one-half returned to London, and the remainder to Birmingham.

M. ANTOINE ETEX, a sculptor, who formerly enjoyed great renown, has just died. He was born in 1808. Antoine Etex was also a painter of considerable merit, and one of his pictures is hung in the Luxembourg. Art was not, however, sufficient for the feverish activity of this extraordinary man. He was the author of numerous articles in periodicals, and also occupied himself with politics. He took an active part in the events of July, 1830, and in 1848 was a candidate at the election for the Constituent Assembly.

The building and finance sub-committees of the Imperial Institute, acting under authority specially delegated to them by the organising committee, have accepted the tender of Messrs. Mowlem and Co. for the erection of the central, eastern, and western towers of the institute, at £18,797, thus making the total value of the contract for the main buildings £161,597. The works connected with the Imperial Institute-road have been commenced, and will be sufficiently advanced for a public thoroughfare to be opened in September.

ON Wednesday the Princess Louise distributed the prizes to the students of the National Art Training School. The report stated that the National Art Training School was before all the rest of the art schools in the country, sometimes to the extent of double and treble their percentage of successes, in every subject of third-grade examination except one (scio-graphy), in which alone the schools in the country were before it. The Princess of Wales's Scholarship was awarded to Miss Hilda K. A. Robinson, and three travelling scholarships of £50 each were awarded to Messrs. John Lee, with the gold medal; Alfred L. Watherstone, with the silver medal; and Fred. Stead, with the bronze medal. The Marquis of Lorne, in responding on behalf of the Princess, said as regarded London itself, its architectural aspect had greatly improved during the last few years, and there was an immense improvement in the statues which had been erected in the squares and other public places in the metropolis.

Alterations have been made at the County Lunatic Asylum, Devon, embracing the ventilation—Robert Boyle and Sons' latest improved form of the self-acting air-pump ventilator being adopted for the extraction of the vitiated air.

Crowland Abbey, situate in the Lincolnshire Fens, near Spalding, has been found to be in a dangerous condition, and steps are being taken with a view of carrying out extensive works of restoration, which will be of an expensive character. It has also been found necessary to begin the restoration of the abbey at Thorney, which will be closed for a considerable time.



## THE BUILDING NEWS

AND ENGINEERING JOURNAL.

VOL. LV.—No. 1751.

FRIDAY, JULY 27, 1888.

## THE REMASKING OF PUBLIC BUILDINGS.

THE idea that a building may possess only one façade, and that to the street, has happily been allowed to pass into the limbo of forgotten things. Our most costly structures of the earlier part of the present century, including most of the classical churches with temple fronts in the style of St. John's, Waterloo-road, were designed with the notion that if one good façade was presented the remaining three sides could go bare, and be shorn of all decorative detail. Even the elder Smirke in his design for the British Museum did not scruple to make the return and rear sides of that edifice quite plain; the National Gallery by Wilkins is another example of a costly front with plain brick walls behind, and the reader will recall to his mind numerous other edifices in which the one care has been to present an imposing façade, quite regardless of the other sides. In towns this practice is, perhaps, somewhat defensible; only the entrance front is seen by the public, the other sides are concealed by buildings, and it would be throwing money away to make façades all round. In those days it was not imagined that any such a clearance of old houses would ever have been made as that recently effected in the rear of the National Gallery, unexpectedly opening up the back of that edifice. The lesson is one to be taken to heart by the architect. Even economy may go to the verge of parsimony in these matters, and future generations may have thrown upon their hands the duty of re-façading the sides of edifices which may be exposed to view in the course of a few years. Thus the rear walls of the National Gallery, as seen from Charing Cross-road, are too unredeeming in their hideous bareness to remain without some attempt at relief or recasing. Something must be done to bring the walls into harmony with new buildings. The architects of the school to which we have been referring were content to carry their stone entablature and parapets just round the corner, and there leave them, the most commonplace brickwork of the "hole-in-the-wall" style taking up the return sides, without internal guttering, the eaves simply finishing the walls. To carry round the façades in their integrity would in many instances be costly and undesirable; it would be better to continue the lines of cornices and horizontal members along the walls, and to depend on plain breaks or panels for relief of the wall faces. But the question of the remasking of our public edifices is a large one. In many cases the original design has not been made with any anticipation of future changes; the window openings have been allowed to come where they will regardless of any distribution or symmetry; in short, only a frontispiece of respectable architecture has been put on a building of merely engineering character. It is not easy to do anything with such a building to make it presentable except to rebuild or mask the sides. Where the plan has been arranged with regard to the spacing of the openings, or the buildings have been blocked out in an architectural manner, the case is different; it is possible with a comparatively small outlay to produce a decent ensemble. Of course the environment of the original building has not allowed the architect in every case to choose his own plan. Surrounded closely on every side he has had to form areas for light and

air, and to place windows where he could, so that when the surrounding buildings are demolished a very irregular mass of walling is revealed. There is less excuse when the site is not so hampered. Though a stone façade to each front would be extravagant, there should at least be a study of each elevation, in anticipation of any alteration in the surroundings. Mr. W. Butterfield's fine brick church of St. Alban's, Holborn, blocked in as it was for many years, is an example worthy of following. When the houses were demolished in Gray's Inn-road they did not uncover a bare, barn-like structure, but a gabled end of surpassing merit, an ornament to the widened thoroughfare. The one-front sites are too often, it must be confessed, a temptation to the designer of pretentious façades. Three sides can be built of barn-like plainness, while on the outside façade is lavished all the ornamentation. The public authorities who make street alterations ought to have a voice in the design of public buildings erected on any inclosed site. They could at least insist that the other elevations should be designed with some reference to future remodelling and demolition; but we suppose that this would be carrying the interests of art farther than necessary or consistent with the principles which appear to have actuated the conduct of the Metropolitan Board of Works. Sites have been bought and sold for buildings on terms that would not justify the expenditure of more money on elevations than was absolutely necessary. Certainly the great cost of sites and their cramped surroundings have been prejudicial to the development of more than one-façade buildings. A splendid opportunity was afforded when the Victoria Embankment site was open for building, but here, too, the same desire to rob the sides and back for the façade is evident. We are in the secret now of the readiness with which designs for large buildings have been passed, and how very much more had to be done by fees than by honest compliance with the Building Act. A future Municipal or County Council would be removing a reproach from our national architecture by making it compulsory that every site should be occupied by buildings with more than one façade. Take, for instance, our Metropolitan theatres. Hardly one of them can show two decent façades, many are mere sheds directly one turns the corner, the stage is uncouth in its hideous proportions, backed up to houses above which it peers like a mammoth factory shed. As soon as the authorities in whom are vested the powers of the Building Act require these buildings to have good elevations all round, we shall see a marked improvement in their design and structure. If it is necessary that at least two sides should be open, both those sides ought to have elevations of a suitable character.

One-façade buildings are generally shams, and their tendency is to degrade the character of architecture. The practice reduces the art to one of making elevations for one front of a building, disregarding plan, skill in grouping, and modelling. Our forefathers thought if they could give us an elevation founded upon Vitruvian or Palladian canons, and an interior in accordance therewith, the other sides of the building could be left without any decoration. With us, cost has more to do with the matter. A large amount of money is expended on one front—say, of a theatre, a town hall, or a bank—costly materials and carved ornament and sculpture in stone are employed. We turn the corner street, and behold! all the grandness has vanished; it is a bare wall, with or without openings—not even a line of string course or cornice to carry the design through; the façade, in short, is merely tacked on to a very plain building—it is merely skin deep. This sort of architecture has been preached against often

enough. Architects and the intelligent public are aware of the sham, yet it is still the rule in towns where there is little inducement to build solidly—where only one front is rendered visible. No one knows how high his neighbour will carry up his new building, so he is not desirous of erecting ornamental gable ends or chimney shafts; but the same excuse cannot hold for the back or rear side, which may command one day a view, and be seen from a new street. What applies to domestic buildings applies with greater force to public edifices, and cost does not operate so largely. There are plenty of the new sites opened out by the demolition of old houses under the Acts for Metropolitan Street Improvements. The Piccadilly improvement scheme, the Upper-street, Islington, remodelling, the Hammersmith and Walworth-road improvements, have created new sites for buildings of a popular character, and it ought to be one of the conditions of building that the exposed elevations should be approved, having reference to the widening of, or contemplation of, new streets.

## THE EMPLOYERS' LIABILITY BILL.

THE Government Bill to consolidate and amend the law relating to the liability of employers for injuries to their workmen has come out of the Standing Committee on Law a much better measure than it went in. It will be a grievous waste of good work if the Bill is not passed this Session and all this ground has to be gone over again. The Government, however, have pledged themselves to do their utmost to get this Bill through, along with that upon Railway Rates, which is now in much the same position, and has been in a similar manner thoroughly revised and worked up in the Standing Committee on Trade, even if it is necessary to hold an autumn Session for that purpose. As to our present subject, the Bill in its amended form strikes us as a fair and satisfactory compromise between the two extremes that were pressed for by the opposing advocates of masters and men. It repeals the Act of 1880 altogether, and re-enacts the best portions of that statute, with many bold and statesmanlike additions, framed, as we believe, in the true interests of both employers and employed. We do not consider that it will lead to an increase of litigation, although it must most assuredly bring about an improvement in the position of workmen and a reduction in the risks they have to run in the course of their employment. The building trades are especially concerned with some of the changes proposed by the Bill in regard to defective plant and machinery, and more particularly as to working by means of sub-contracts.

The clause as to an employer's liability for defective plant has been redrawn in wider terms, and it now makes him responsible for an accident happening "by reason of any defect in the condition or arrangement of the ways, works, machinery, plant, buildings, or premises connected with, intended for, or used in the business of the employer," where such arose from negligence. There have been many cases in which the meaning of this word "defect" had to be considered by the Courts; and, curiously enough, the Court of Appeal has just (19th July) given judgment once more upon its application. In the action of Walsh v. Whiteley and another, the plaintiff was employed by the defendants at their mill at Blackburn as a card grinder on a carding machine. It was his duty to pass a strap over a revolving wheel in which there were certain holes made for the purpose of lightening the wheel by using less metal. In one of these holes his thumb was caught and cut off. It seems there are some 11,000 machines with similar wheels used in Lancashire, so that the case was of very general importance. The



point was whether the wheel was defective within the meaning of the Act. In the County Court the plaintiff got a verdict with damages. In the Queen's Bench the judges were divided; and now in the Court of Appeal Lords Justices Lindley and Lopes held there was no such "defect" in the wheel as to make the defendant liable, while the Master of the Rolls took the opposite view. This division of opinion fairly represents the two schools of thought which have all along existed in the Courts upon the construction of this statute, and which have naturally led to conflicting decisions: one taking wide and liberal views from the side of the men, the other looking more at its technical and narrower meaning, from the side of the masters. In this case, however, seeing that the plaintiff had himself used the machine for 13 years without accident, and seeing that the wheels were generally made that way everywhere, we must agree with the majority of the Court of Appeal in thinking that there was no such "defect in the condition" of the defendants' machinery as would bring it within the Act of 1880. It would seem to us, however, that this machine would be covered by the words "defect in the arrangement," as contained in the new Bill; and that the effect of this addition may be to compel employers to use the best machinery obtainable, and to cease using that which is dangerous, even though usual or general in their business.

The whole series of clauses defining an employer's liability have been strengthened in the new Bill in favour of the employed. Thus it is proposed that the mere fact of a workman continuing to use defective plant or the like shall not cause him to be deemed to have voluntarily incurred the risk of injury, though it will still be his duty to inform his employer or foreman of any such defect or negligence. This clause is directly aimed at some judicial views as to running the risks of the service which are based upon the old common law, and have lately been propounded on the Bench. So, again, as to the word "superintendence," we have here a wider interpretation, and an employer will be liable for the negligence of any foreman or the like exercising a general superintendence over workmen, "whether he is, or is not, ordinarily engaged in manual labour," which removes yet another judicial objection, and lets in some common sense where it was greatly needed. The new clause dealing with the position of workmen who are under contractors or sub-contractors, is, of course, of much interest and importance to the building trades, to which, indeed, it is mainly applicable. The object of the proposed change in the law is to make the responsibility for injuries fall upon the real employer, and to prevent his being able to shelter himself behind a nominal contractor, where the accident arose from negligence for which he should be liable. To enable such a workman to recover damages against the actual employer or "the person for whom the work or any part thereof is done," as the Bill has it, he will have to prove three things. First, that this person "owns or supplies any ways, works, machinery, plant, buildings, or premises used for the purpose of executing the work." Second, that the injury to the workman arose from a defect in the condition or arrangement of such plant, &c. Thirdly, that this defect, or the failure to discover and remedy it, arose from the negligence of the person for whom the work is done or any part thereof, or of some person being in his service and intrusted by him with the duty of seeing that such condition or arrangement is proper. It is obvious that, when a workman who is engaged by a contractor or sub-contractor has proved these three things, he has also proved that the nominal contract is a sham, and that the employer is really con-

trolling the works, and so should be individually responsible. But if the plant or machinery is neither owned nor supplied by this employer, then he will be in no way liable. Nor will he be liable even if this is so, unless the defect causing the accident is shown in some way to have arisen from his own negligence or that of an authorised agent or foreman in his service. It follows, from this consideration, that the Bill does not in any way alter the law whenever there is a genuine contract or sub-contract, over the carrying out of which the real employer has no control; and this is as it should be, for such contractors are usually substantial men, to whom workmen can look for compensation in case of injury. The Bill, of course, saves the liability of contractors as employers, so that double compensation shall not be received for the same accident, and it also saves all rights and liabilities as between the person for whom the work is done and his contractor or sub-contractor.

The main contest over the Bill has been upon the question of contracting out of the Act. As now amended, a reasonable compromise between the extreme views of those who would avoid all such contracts and those who would allow them in the ordinary way without any restriction, has been effected. It is proposed that any contract by which a workman deprives himself of any right under the Act shall be void, unless made in pursuance of his written request, and unless made in consideration of the employer's undertaking as to insurance, and which has been fulfilled. It is declared that this undertaking shall be to make, so long as the workman continues in his employment, an adequate contribution towards an insurance fund against every accident occurring in the course of the service, and to make good all sums payable in respect of the insurance but not paid. By an adequate insurance is meant such an amount as will insure to the workman or his representatives a benefit equivalent to the compensation recoverable under the Act. The employer's contribution may be either a capital sum or an annual or other periodical payment. Evidence of similar contracts in similar trades may be given to prove the sufficiency of the contribution, and the Home Secretary or the Board of Trade are to be empowered to consider and decide the question upon application by either employer or employed. The operation of these insurance clauses cannot be judged of until it is seen how they work out in practice; but, in effect, they make general the system already adopted by the large railway companies, in many collieries, and by other employers of labour, and there seems no reason why it should not prove equally satisfactory all round.

Amongst the minor alterations there are several of much utility and importance. Thus, the time within which notice of injury must be given is extended from six weeks, as at present, to three months, while there is a general proviso that its absence or insufficiency shall not be a bar to an action if the Court is of opinion that there was reasonable excuse, and that the defendant had not been prejudiced. This clause sets at rest some judicial doubting, and will prevent actual injustice being done by technical objections. The limit of amount recoverable is here put at three years' estimated earnings, or £250, whichever is larger, which practically raises the limit to the sum stated; but from this is to be deducted any money paid to the workman or his representative by way of insurance on account of a contribution from his employer. There is also a very useful clause providing that if an employer intends to defend on the ground of want of, or insufficiency of, notice, or that he was not the employer of the workman, he must give notice of these special defences to the Court

and the plaintiff seven days before the hearing. The effect of this necessary amendment will be that unless an employer does give the notice it will be taken as admitted that proper notice of injury was served in time, and that the plaintiff was in the defendant's employment. Where compensation is awarded for the death of a workman, power is given to the judge or the jury to apportion the amount between the wife, husband, parent, or child of the deceased as they may determine. The definition of a workman is redrawn, and it now covers, besides the ordinary class, every person employed in or about a public conveyance by land, or about a vessel engaged in inland navigation. This will remedy the injustice of excluding bus and tramcar men, and those working upon steamboats and the like. But all domestic and menial servants, clerks, and agents are still left outside the statute. Existing contracts are saved, subject to the right to determine them. There are special clauses applying the Act to seamen, and dealing with its carrying out in the Scotch Courts, which we have not thought it needful to explain. Altogether, the Bill as it now stands is a sound and businesslike measure, and one which has about it every appearance of working out well in practice.

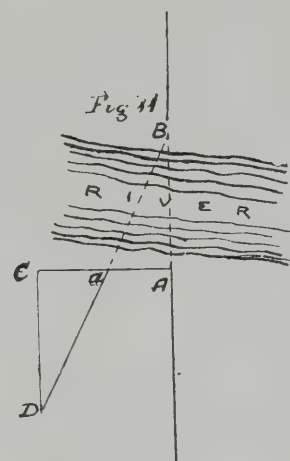
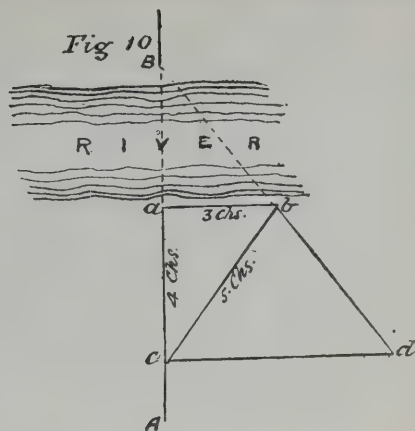
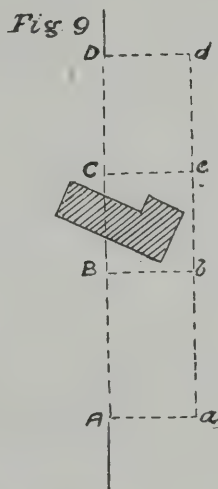
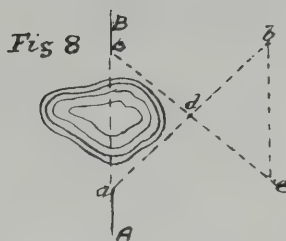
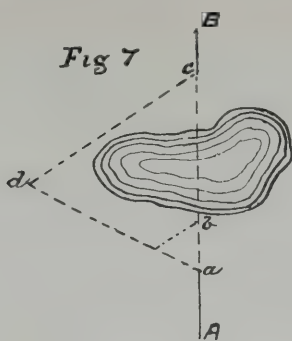
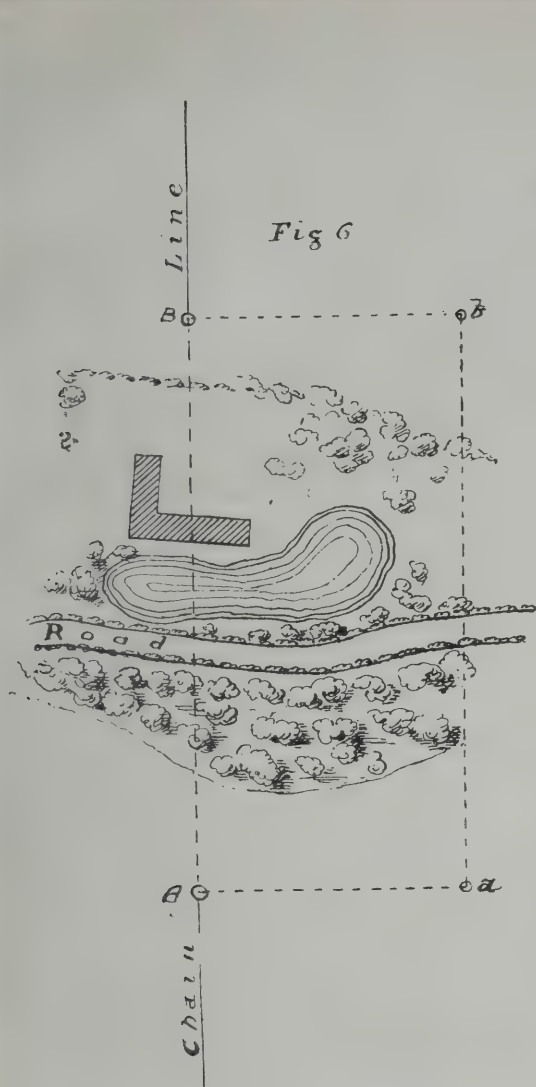
### LAND SURVEYING.—III.

#### OBSTACLES AND INACCESSIBLE DISTANCES.

HAVING given examples of chaining and the method of keeping the field-book, we may direct the reader's attention to a few of the obstacles encountered in chain surveying. Unless a base or chain-line has been examined beforehand and poled out, the surveyor or chainman may unexpectedly encounter an obstruction to his progress. The natural undulations of the ground often make it difficult to see what impediments are in the way. One of these which we met with in conducting a survey will explain to the reader the kind of obstacle which often obstructs a base-line of some length. The survey was in a hilly part of the country, the undulations of the ground frequent and sometimes abrupt, and the line chosen lay over several fields from an elevated station to a chimney on the brow of a distant hill. Midway there was a deep depression or hollow, which was obscured by a low line of trees. Nothing could be seen of any obstruction to the line, but on descending the declivity a large pond and some farm-buildings, whose roofs were not higher than the brows of the hills on either side, blocked the way. As we descended the hill, the forward object—the chimney—disappeared from view, and it was first of all necessary to sight our line through the obstruction. We fixed a pole and flag at A, at a position from which a sight of the distant chimney could be had. We walked round the farm to B, where we could get a glimpse of A, and the station from which we started in line with it. At B we put in a pole and flag ranging with A and distant station O. The distance from A to B had to be found. To do this, the surveyor should proceed to the right or left of the obstruction, and at convenient points erect perpendiculars from A and B of such a length as to clear the obstruction, and so allow the chaining to be continued. In the case referred to we found three chains sufficient, and staves were fixed at *a* and *b* (see plan) perpendicular to the stations at A and B. Then the distance *a* to *b* gave the length of the interrupted line, because it was parallel by construction to A B. The perpendiculars may be set out with the sextant, cross-staff, or by the chain in the manner we have already described.

There is another case of obstruction. Let us suppose a house or other building is on the same level as the chain-line, and that we cannot see the poles or any distant mark beyond it. In other words, no poles can be





ranged forward; but we want to continue the chain-line beyond the obstructing building. To do this, we (see Fig. 9) erect a perpendicular at  $Aa$ , say four chains from the building, and another near the building at  $Bb$ , and make them each long enough to clear it. The perpendiculars must be accurately set out, and staves put up at  $a$  and  $b$  exactly at the same distance. Then we range the staves beyond the house, fixing one at  $c$  to clear it, and another four or more chains away at  $d$ . Erect perpendiculars  $cC$  and  $dD$ , and make them exactly equal to  $Bb$  and  $Aa$ . Then it is evident that  $C$  and  $D$  are in line with  $A$  and  $B$ , and the chaining may be continued after taking the interrupted length  $bc$ , and any offsets to the building. Often the obstruction is only a few feet, and the offset staff is then sufficient to take the perpendiculars till the house is cleared.

When the sight is not obstructed by the object, a very simple geometrical construction on the ground will suffice. Suppose a pond or a lake obstructs the chain: Take the chain to the edge of pond at  $b$  (Fig. 7), at 50 links or half a chain-length put in an arrow at  $a$ , and fasten the ends of chain to these points  $a$  and  $b$ . Extend the 50th link of chain so that the sides may be stretched equally to  $c$  (which has been omitted by the engraver), then an equilateral triangle is formed. Measure in the direction of the side  $ad$  till the pond is passed, and construct a similar triangle at  $d$ , giving the side  $de$ , which must equal the side  $ad$ , forming two sides of a larger equilateral triangle. Then  $e$  will give the point in the

direction of the line  $AB$ , and the distance  $ae$  will equal the side  $ad$  or  $de$ , because the triangles  $abc$  and  $ade$  are, by construction, both equilateral. Another method is founded on the theorem that angles vertically opposite are equal (see Fig. 8). Arriving at the edge of the pond, or some distance from it,  $a$ , sight a line to the right or left hand to clear it ( $ab$ ), also another that will cross this line,  $cde$ , at, say, a right angle, and make a mark at  $d$ . Measure  $db$ , and make it equal to  $ad$ , also make  $de$  equal to  $dc$ . Then  $eb$  will equal in length the line  $ac$  to which it is parallel.

Let us suppose a river has to be crossed at right angles by a chain-line—a very common experience. The river is too wide to throw the chain over. Resort in such a case must be had to the principle of similar triangles. One easy method of proceeding is as follows:—Chain up to a convenient point on the banks of river, where a "perpendicular" can be erected, say, at  $a$  (Fig. 10). Fix a pole at that point, also at  $c$ , 4 chains back, and erect a perpendicular  $ab$ , 3 chains long; then if the hypotenuse  $bc$  measures exactly 5 chains, the right-angled triangle is correct. Set up a pole at  $b$ . Next, from  $c$  erect another perpendicular of 6 chains,  $cd$ , and fix a pole at  $d$ ; then  $db$  should measure also 5 chains exactly. If correct, send across the river a pole to fix at the intersection of the chain-lines  $AB$  and  $db$ . By construction  $AB$ , the width of river required will equal 4 chains, and the hypotenusal line  $Bb$  5 chains. Observe that the base of the first triangle  $ac$  should be made of sufficient length, or be fully equal to the width of river. If the river looks wider than 4 chains, go back from  $a$  8 or more

chains, making the other sides in the same proportion, or multiples of 3, 4, and 5. Fig. 11 gives a simpler method.  $AC$  is erected perpendicular and bisected at  $a$ ;  $CD$  is also erected perpendicular upon  $AC$ ; then poles at  $B$  and  $a$  are sighted to cut  $CD$  in  $D$ . By similar triangles,  $CD$  equals the distance  $AB$ .

An important observation ought to be made here. These interruptions frequently cause confusion in chaining by the arrows being counted wrong, unless the following rule is observed:—Enter in the field-book the distance measured to edge of pond or river, and note how many arrows the leader has in hand before any further chain-work is undertaken. After finding the width of river or obstruction, add it to the chainage previously noted, taking care to make the necessary allowance before starting again on the other side of the river. For example, if the distance across is 400 links or four chains, the leader must have four arrows less in hand than when he was on the first side of river, and the follower four more arrows. Should the whole chainage plus the river width be a broken number, say, 2,360, begin chaining at the 60th link. It is safer when the line is interrupted to make a sketch plan of the river and constructional lines, carefully noting the distances measured as a check on the field-book.


We have already noticed the rule as to the fence and ditch, but a few words more are necessary in considering the subject of obstructions. Let us suppose we are surveying a field, and have come up to a fence or hedge, the ditch being on the other side. The



general rule is that the ditch belongs to the field in which we are standing, so that the chain must be passed through or dragged through the hedge to the brow of the ditch on the other side, an allowance of five or six links being made for the width of ditch from the quick of hedge. This allowance is necessary, as it is often difficult to find out the brow of a ditch, it being usually trodden down, and is often the side of a footpath. In some parts of the country a wider ditch is allowed, varying from seven to ten links, so that it is necessary to inquire of some farmer the local custom. If we are chaining the other way, having to cross the ditch to reach

## FIELD-BOOK.

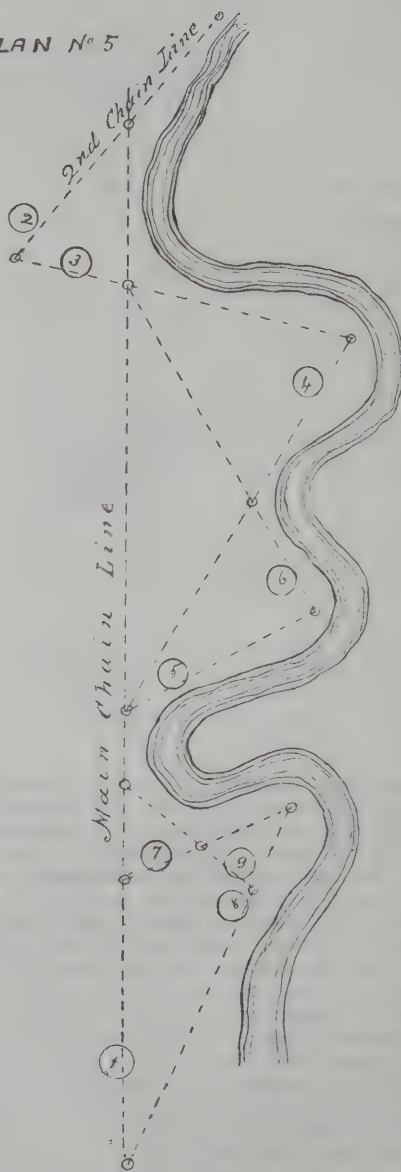
(7)		
Line 3	(530)	Line 4
	(80)	31
	120	15
	100	20
	30	42
(6)	0	end of line 5
Line 6	(305)	20
	210	32
	100	20
	50	10
(5)	0	end of line 4
	(610)	end of line 4
	(260)	to (630) line 1
	210	Line 6
	100	
(4)	0	end of line 3
	(480)	end of line 3
	40	362
	30	260
	160	(1250) line 1
(3)	0	end of line 2
	(350)	end of (2)
	250	30
(2)	0	end of line 3
	(1475)	end of (1)
	1410	25
	1360	20
	1310	30
Line	1250	(3)
	630	end of lines 4, 5
	530	end of line 9
(1)	410	end of line 7
Begin	(1)	line 8

the hedge, the chain must be dragged up to the "quick" of hedge, and a deduction of six or more links made from it. Thus if the chain crossed the quick or centre of hedge at 56, we deduct six links and enter 50 in the field-book. Should there be no ditch on either side of the hedge or fence, the chainage is measured to the quick or centre, and the fence marked in the field-book thus . When growing crops only are to be measured, the boundaries are those of the crops. Sometimes the fence is not at right angles to the chain line, and in this case a greater allowance than six links is necessary. The most expeditious way of finding the boundary is to run the chain through the fence, and

see where six links of the offset-staff placed square with the fence will cut the chain. A paling has usually the nails driven from home, the fair side being inwards. With regard to walls, the ownership should be inquired into; if it is a party-wall, the centre line is the boundary.

As in chaining by obstructions a right angle or perpendicular has often to be set out from the chain or base line, it may be of service to point out an expeditious method of doing so when a cross-staff or sextant is not carried. Set off on the chain-line 40 links from any point C (Fig. 19), to another d fix one end of the chain at C. Then take 80 links and hold it at a firmly. Take the chain at 50 links from the first end and pull

PLAN N° 5



it tight both ways until the sides form two sides of a triangle, putting down an arrow at the angle b, which will be the perpendicular to the second point.

As a further example of chain surveying, we give a plan of the windings of a river through flat country, showing the best method of setting out the lines. We may assume the river forms the boundary of an estate, and that it is required to plot it with accuracy and despatch. We also assume there is no plantation to interfere with the ranging of the lines which form the main triangle. The first thing is to walk over the ground and pole out the most desirable stations for the lines which will best form the sides of triangles, and take up the offsets to the river's brink. A little care and attention to this preliminary work will be amply

repaid. The triangulation we show is self-proving and very simple. The two large intersecting triangles which take up the chief bend in the river are easily chained and well "tied." The main line 1 forms the base, and should be accurately measured, its direction being determined on the ground, and the four stations carefully noted in the field-book; the direction of the second chain line is determined by lines 1 and 3, though it might also be found by the aid of an angular instrument the use of which we shall refer to by-and-by. We indicate by the numbers in circles the order in which the lines ought to be chained. The offsets along the river may be taken every half chain or so apart, if great accuracy is required. The largest triangles should be laid down first in the plan, their accuracy being proved by the intersection. If the bends are much more than a chain in curvature, minor lines or triangles can be run to take up the detail. We have been supposing the ground on the margin of the river is open; but if the sight is obstructed by woods, the bends of the river must be determined by taking the angles with an instrument.

Our plan is accompanied by the field-book for the main lines, the others being entered in the same manner; but we prefer, in small surveys of this kind, to obtain a map or make a sketch plan of the river with the chain lines entering the distances and offsets as they occur. At any rate, it is a good plan to enter all the station distances on the plan, and take any offsets where the irregularities of the river render it necessary. One or two rules about setting out triangles for surveys of this kind may be given here.

(1) A well-conditioned triangle is that in which the three angles are more or less nearly equal; therefore, a triangle that has its angles about 60° is the most desirable to adopt in laying down a system of lines. (2) All diagonals for a like reason ought to intersect as nearly as possible in the centre of the ground if it is quadrilateral in shape. (3) Acute and obtuse angles are to be avoided, as it is difficult to obtain very exactly the intersection of such lines, and the plotting is liable to error. (4) The fewer the triangles into which the area is divided the better.

## THE METROPOLITAN BOARD OF WORKS INQUIRY.

THE Royal Commission appointed to inquire into the alleged irregularities of the Metropolitan Board of Works resumed its sittings on Tuesday.

Mr. Arthur Cates, architect to the department of Woods and Forests, said he had observed that a statement had been made to the effect that Mr. Vulliamy's opinion of the value of the Pavilion site was supported by the view of Mr. Cates. He presumed that this referred to himself, because he was aware of no other surveyor of that name. In private conversation with Mr. Vulliamy he had informed him what he had obtained for land in Piccadilly, but he was in no way consulted as to the Pavilion site. If he had seen a plan of that site he should have certainly expressed a different view.

Mr. F. H. Fowler, architect, and late a member of the Board of Works, was again called. He explained in detail the cases in which he had advised clients on questions affecting property over which the Board had jurisdiction. In the course of seventeen years the total amount of fees which he had received in such cases was £550. He wished to deny that there was any arrangement made by him with Mr. Sefton Parry under which it was suggested that he was to supplant Mr. Emden as architect of the Avenue Theatre. No communication was made to him with regard to becoming joint-architect of Terry's Theatre. He also emphatically denied that there was any truth in the statement that he requested Mr. Snelling to introduce him to the syndicate who were carrying out the improvements at Brixton. By Mr. Bosanquet: Mr. Snelling said, "I met Mr. Fowler



and he asked me to introduce him to the syndicate. I told him that it would be of no use, as I had introduced an architect of my own whom I had known many years." Do you say that nothing of that kind passed?—No, I never thought of acting as architect. Mr. Snelling goes on to say that you remarked, "Oh, it would be advisable, because I could make things go so easy for you. I could make a nice promenade in front for you." What do you say to that?—I certainly said, "Here is a public disgrace and scandal in Brixton, and if you can make an improvement, I will do all I can to assist you," but not as an architect—as a public man. What scandal?—I was referring to the forecourts not being built upon close to the railway station.

Mr. Robert Evans, surveyor, recalled, said that he had suffered considerable injury by reason of a statement that he had only just started in practice as an architect when he laid out the Albany-road Estate, at Walworth, and that in consequence Mr. Fowler was called in. The fact was that he had been in practice 28 years.

Mr. Snelling, recalled, adhered to his account of his interview with Mr. Fowler, and said that he told the members of the syndicate of it at the time.

Mr. Geo. Edwards, a member of the Board of Works since 1873, and deputy-chairman from 1886 to 1888, was the next witness. By Lord Herschell: At a recent meeting of the Board you used these words, "I hope we are not going to drift back into what used to exist here—an inner cabinet." What did you refer to?—My feeling was that there was a certain party at the Board which wished indirectly to rule it, and conferred together prior to the meetings. Whom did that inner cabinet consist of?—It was merely a surmise. I thought Colonel Munro, Mr. Runtz, Mr. Selway, and two or three others sitting round the same corner. You speak of "drifting back" into it, as if it were a thing which had existed and had ceased?—Since the Board had increased in numbers I think it would not tolerate that sort of thing as much as it did before. Your idea was that the Board was led more or less by a certain number who acted together!—Yes, certainly. Who were the two or three others?—I should say Mr. Fowler was one of them. They were the moving parties, and used to have great influence in getting members to vote on questions which they took up. Was Mr. Saunders one?—He would not be so much at the Board, but certainly he would be consulted afterwards. Did you support the letting of the Pavilion site to Mr. Villiers?—No; I was directly opposed to it. By Mr. Meadows White: Had you any suspicion of Mr. Goddard's honesty?—The first suspicion I had was when a reference was made to him as to whether Mr. Villiers would advance his offer. Putting one or two things together—first the fact that he had introduced Mr. Villiers, and then that he had committed the Board to Mr. Villiers—I began to have very grave suspicion. Lord Herschell: How did it come before the Board that Mr. Goddard had done this? I thought it was Mr. Vulliamy. Witness: We used to read between the lines. Mr. Vulliamy was a weak official, and I always looked upon Mr. Goddard and Mr. Robertson as Mr. Vulliamy. Did it not occur to you that if Mr. Vulliamy was so weak that he was merely Mr. Goddard and Mr. Robertson's voice, some steps ought to be taken with regard to it?—Well, you know what boards are. They are minorities and majorities. (Laughter.) I for years endeavoured to persuade my colleagues that we ought to insist on the resignation of Mr. Vulliamy, and was unsuccessful. When Mr. Vulliamy was pensioned and was afterwards allowed to come back, was there any opposition?—I considered it most ridiculous. By Mr. Bosanquet: Had you ever any suspicion of Mr. Robertson?—Oh yes, from his extravagant living. When did that suspicion first arise?—Five or six years ago. By Mr. Winch: I suppose you were not one of those who voted that Mr. Vulliamy in addition to his salary should have his pension running concurrently?—Certainly not.

Mr. Selway hoped the commissioners would allow him to disclaim any knowledge of an inner cabinet in the Metropolitan Board of Works. He declined to accept the honour which Mr. Edwards wished to confer on him.

Mr. Winch: I understand that this cabinet was without emolument, which is rather unusual. (Laughter.)

Mr. G. B. Richardson, who had been a member of the Board of Works since 1862, said that Mr. Vulliamy was formerly a very excellent officer, but of late years was very inefficient. He had urged the chairman not to allow the department to fall off, as it was becoming a disgrace to the Board. Had you suspicion of Mr. Robertson?—Since 1875 I never had any faith in him, and he knew that perfectly well. The evidence taken then in respect of Mr. Fuller's complaint about the book of reference was sufficient to show that he was dishonest. There were two Messrs. Fuller in London constantly seeking for compensation cases. One of them got a great many, the other very few. They were relatives. The one who was successful in getting many believed there was something wrong, and laid a trap. He wrote to Mr. Robertson, offering him a couple of guineas for a copy of the reference book which contains the addresses of all claimants against the Board and the character of the property. The bait took. Then Mr. Fuller wrote to the chairman, informing him of what had taken place. A committee of the Board instructed the then solicitor (Mr. Smith) to see Mr. Fuller. Mr. Smith was shown the book which had been received from Mr. Robertson, and the cheque drawn out in that gentleman's favour. Mr. Robertson did not wish to pass the cheque through an account of his own, and had asked that it might be cashed. He was sharp enough not to put his name on the back. There was not absolute evidence, but it was stated distinctly and clearly that Robertson went down to the office, received the two guineas, and left. In reply to Mr. Winch, the witness said that a report was made by Mr. Goddard to his chief, Mr. Vulliamy, that he had reason to believe that Mr. Robertson was living beyond his means. Mr. Robertson was keeping two carriages and a livery servant. He used to drive to the Board's offices in a carriage, with a livery servant behind him, like a gentleman in the highest degree. According to Mr. Goddard's statement, Mr. Vulliamy said that he knew that some property had been left to Mr. Robertson, and he would therefore take no notice of it.

The inquiry was adjourned to Friday (to-day).

#### THE SOCIETY OF ARCHITECTS.

BY the courtesy of Mr. J. H. Greathead, the engineer, a visit was paid on Thursday week by the members of the Society of Architects to the subway now in course of construction for the purpose of providing the inhabitants of South London with underground railway communication with the City. The members assembled upon the spot where the Kennington Station is to be built, and were conducted over the works by the resident engineer, Mr. Basil T. Mott. They descended by a cage down the shaft, 60ft. deep, which is eventually to be fitted with an hydraulic elevator to convey fifty passengers at a time between the over and underground stations. From the foot of the lift passages branch off at easy gradients to the up and down platforms, which, however, have not yet been constructed. At the present time temporary headings have been driven on either side, where the station is to be built, to meet the permanent tunnelling beyond, which is constructed of cast-iron rings, previously coated with Angus Smith's anti-rust solution, built up in segments. The up and down lines have been kept perfectly distinct, running in different tunnels, mostly side by side, but occasionally one beneath the other. To avoid the expense of settling claims for compensation, such as have proved a heavy burden to other undertakings of a similar nature, the railway is being constructed, wherever possible, beneath the public roads. The principal attraction to the visitors was the method adopted for driving the headings. This consists of a steel shield slightly larger than the rings, with knife edge around its circumference, driven forward at the rate of 13ft. a day by hydraulic rams worked by hand. The earth in front of the shield is first loosened to a small extent by manual labour, and yet more by a series of iron shod piles attached to the

press and pushed forward in front of the cutting edge. The space between the earth and the casing left upon the shield being moved forward is subsequently filled with liquid hydraulic lime injected by means of compressed air. Great care, the visitors were informed, has to be taken in setting out the directions and gradients of the tunnels, the line of route having to be first carefully surveyed above ground and the same measurements and angles having been obtained below with absolute exactitude. The cars will, it was understood, be propelled either by cables and fixed engines or by electricity to avoid vitiation of the air, and will act on the principle of piston rods in the tunnel, producing a perfect system of automatic ventilation. At the conclusion of the visit, the President of the Society of Architects, Mr. W. H. Seth-Smith, proposed a vote of thanks to Mr. Greathead for permission to go over the works.

A special general meeting of the Society was held at St. James's Hall on Tuesday, the 24th inst., under the presidency of Mr. W. H. Seth-Smith.

Messrs. Charles Edward Butcher (Colchester), Fred. Cartwright (Bromley, Kent), Harry Clayton (Barborton, S.A.R.), David Morgan Davis (Neath), Fred Harrison (Lytham, Lancs.), William Hope (North Shields), Thomas Kershaw (Huddersfield), William King (Bakewell, Derbyshire), Frank Morton Palmer (Horwich, Lancs.), Thomas William Turnbull Richardson (Stockton-on-Tees), Michael Shelborne (Grant-ham), and Frederick Chapman Tyos (Headingley, Leeds) were duly elected as members of this Society, and three other gentlemen were nominated for election at the next meeting.

After the rules passed on June 19th had been confirmed, a long discussion arose upon a proposed new rule giving the Council power to deal with the members proved guilty of unprofessional conduct, which eventually passed in a considerably amended form.

The inventor of the system of ventilation used in the meeting-room, Mr. F. H. Smith, then explained its action, the meeting concluding with a few experiments.

#### LONDON BOARD SCHOOLS AND MUD FOUNDATIONS.

A MOST discreditable state of things is being brought to light with respect to the London Board Schools. In no single instance where investigation has followed complaints, have things been found according to specifications certified.

As a test case, the condition of the school in Broad-street, Radcliffe, was brought before the Board. This building was begun in 1884 and finished in the autumn of 1886. In May last Mr. Bailey, the new architect to the School Board, reported that "the foundations, instead of resting upon hard ground, as they should do, stand immediately upon a soft bottom of foundry ashes." Mr. Murray, the measuring surveyor, made a further examination, which showed that whereas the contract depth of the foundations for the walls was 10ft., the depth paid for varied from 11ft. 9in. to 15ft. 6in., while the actual work executed was only 7ft. 3in. to 9ft. 9in., and one wall carried down to a depth of 3ft. below the ground-floor line rests upon what appears to be a thin layer of concrete 6 or 7in. thick, under which is a mass of rubbish having no binding qualities. "The concrete generally is composed of grey-stone lime, ballast, large flints, old bricks, and brick-bats. The footings seem to be built principally of old bricks."

On this the committee addressed a letter to Mr. E. R. Robson, the late architect, inclosing the reports, and stating that "they propose to recommend the Board to call upon you to make good the loss occasioned to the Board owing to their payment on your certificate for work which has not really been done. They will be glad to know, before submitting this report to the Board, whether you have any observations to make." Mr. Robson replied on the 19th June, saying, among other things:—

The committee appear to have it in their minds that it was the duty of the architect to see everything personally, and that he should be held personally liable for the mistakes or misconduct of the officials acting under him, as well as of the builder. From the nature of my appoint-



ment, and the enormous pressure devolving upon me, the first was always known to be impossible in my case; and the second is, I venture to think, an unreasonable view. In addition to the clerk of works, an inspector of works had been appointed by the Board with the distinct object of relieving me from the bulk of the inspection, and he devoted his entire time to the work. My own inspections were directed more particularly to points of light, ventilation, and other matters affecting the daily life of the school, of which the inspector could not be expected to judge. My certificate, when given, was based on the results arrived at by the surveyor. . . . I cannot for one moment believe that the Board, under the circumstances, and with a full knowledge of the facts, will call upon me to make good the loss in such cases, even if I were liable, knowing as they do that I have not been personally blameable.

In the mean time the committee had directed a further and more complete investigation by Mr. Rickman, quantity surveyor, who has been specially acting as their adviser, who, on 22nd June, sent in a report, from which the following are extracts:—

"There are a number of cracks in that part of the school which has no basement." "The concrete has unbroken brickbats and large lumps of slag. The mortar of footings is like black mud. The bottom appears good." "Concrete bad; it looks like muddy river sand and large lumps of unbroken slag. The mortar bad. The bottom seems good, and may be old concrete from pre-existing building." "Water was found in hole standing 6in. to 8in. above the bottom, the foundation bad; a bar buried easily 2ft. 6in. deep." "Bottom bad and soft." Concrete made with brickbats and large lumps of slag. The mortar better, but the joints not flushed in. Some of the footings are old red bricks." "It would appear as if the concrete were not good enough to be carried on piers (which under some circumstances might have been inserted and carried down to firm ground), but that when the building comes to be underpinned both the concrete and the footings would have to be removed; but this must depend on further investigation as the work proceeds."

On investigating the various returns it appears that the final certificate of the architect was given in December, 1886, and the account was then paid. Within less than a year cracks appeared in the main walls of the school.

The resolution fixing responsibility upon Mr. Robson, the architect, and calling upon him to make good the loss, formed the subject of an excited discussion at the last meeting but one of the Board. It was, however, ultimately carried by a large majority. What the architect's reply to this official demand will be remains to be seen.

If this case stood alone it would be sufficient to disclose a gross amount of laxity and carelessness—if nothing worse—in the department. But the committee have had to inquire into complaints respecting schools in every quarter, and similar conditions have been disclosed. Of the Queen's Head Schools, Islington, Mr. Robson himself writes that a visit he paid "reveals a case of wilful misrepresentation on the part of the clerk of works. The concrete shown on the plan (of foundations) does not exist under the building to the amount there figured. . . . It will be necessary forthwith to underpin and build two piers in cement."

Out of a total expenditure for the year ending 25th March last of £1,052,224, the net cost of educating the 328,405 children in average attendance was only about £630,000. The whole balance was devoted to enforcing compulsion, to industrial schools, to office charges, and to interest on loans expended in purchase of land and erecting these buildings.

## THE TURKISH BATH: ITS DESIGN AND CONSTRUCTION.

By R. OWEN ALLSOP, Architect.

### V.—CONCLUSION OF DETAILED CONSIDERATION OF FEATURES PECULIAR TO THE BATH.

**D**RESSING and cooling accommodation in a public bath may, I should have observed in my last article, be provided in one of the following ways: 1.—A separate frigidarium and distinct dressing-room, arranged (a) in direct communication with one another, or (b) connected by a lobby, corridor, or passage; 2.—A combination apartment arranged (a) with dressing-boxes around the walls and couches in the centre, or vice versa; (b) with Oriental divans; (c) with couches screened off in pairs by dwarf wood screens; (d) with a few private dressing-boxes, a few couches, and a few lounges, and easy, cushioned chairs; and (e) as a simple room with couches placed therein, by the side of which the bather will undress, and on which he will recline after his bath.

The first of these arrangements may be admirably adapted to unpretentious establishments, where, however, it is wished to employ separate rooms; the second (1, b) is only suitable for elaborate baths of the highest class, in which it may be adopted with excellent and with practical results. Of the combination arrangements (a) has little to recommend it, (b) is expensive and extravagant of space, though it may be made very effective in appearance, (c) is suitable for ladies' baths; (d) is very practical, and gives the apartment a pleasant, homely look; and (e) is best for cheap baths, being the simplest arrangement possible, wholly unsuited, however, to establishments of any pretension.

Of the requirements of the separate cooling and dressing-room I have already spoken. It may be as well to add, however, that in the case where the two apartments do not immediately adjoin, the means of communication be carefully studied; that it be free from cross draughts of cold air; and that it be dignified and room-like—not a mere passage. It may have the air of an ante-room, but must not be crossed by entering bathers who have not divested themselves of their boots or shoes. Slamming doors should be avoided, having regard to the exposed condition of the bathers.

Personally, I would gladly enter a protest against the employment of the combined cooling and dressing-room as a decidedly uncleanly habit. It is certainly not pleasant to know that, having obtained perfect physical cleanliness, both inwardly and outwardly, one must return to couches whereon previous bathers may, as likely as not, have, however temporarily, deposited more or less of their underclothing or superimposed raiment. Moreover, the garments of a score or more of bathers depending from the walls of a cooling room do not, theoretically, at least, tend to sweeten its atmosphere. But economy of construction is nowadays a question that must be considered at every step, and the combination apartment saves both space and materials, and is also economical as regards attendance.

In arranging the plan of a combined cooling and dressing-room it is necessary to first decide as to how the apartment will be furnished—viz., which of the plans above mentioned shall be adopted. This is much a matter of individual taste, though the demands of decency suggest the provision of screens. It is often the best course to provide a cooling-room of what may be called the "picturesque" order, or the reverse of stiff formality. By this I mean such an arrangement as 2 d. The bather can then choose between reclining in semi-privacy or in the open, or, again, resting in an easy-chair. With a handsome plunge-bath and a pretty little fountain, such rooms may be rendered very attractive.

Whatever be the plan decided upon, it must, I repeat, be carefully thought out previously, and not left as an after-thought. The size of the reclining couch will be found to be the governing feature. This should be 6ft. 6in. long by 2ft. 6in. wide, or 6ft. by 2ft., according as luxury or economy is the end aimed at. Next to this must be considered the space allowed for each bather to dress in, and also the routes for bathers and attendants. Four feet between the couches is a sufficient space where couches are screened off in pairs—a distance I have elsewhere named as proper in a separate cooling-room; but this was an oversight, as in such places less than 3ft. will suffice, as the bather never dresses or undresses therein.

Couches may be arranged in pairs or singly. Two pairs of couches screened off with only a small space between of 4ft. or so is an objectionable arrangement. It is difficult to explain why this is so; but the bather who has made one of four strangers thus closely penned up will appreciate it. An arrangement of four couches must expand into a spacious divan.

The floor of a cooling-room must be boarded. In a bath where cost is subordinate to excellence, a parquetry floor may be provided, and mats employed, as cleaner than fixed carpets. The walls and ceilings may be treated in any manner that may be chosen—plastered, papered, or decorated with colour.

Any shaped room may be adapted as a combined frigidarium and apodyterium, so long as it fulfils the essential points—i.e., that it be spacious, capable of easy and perfect ventila-

tion, and of being kept cool, light, and cheerful. In the cooling-room the bather will stay longer than in any other apartment, and no pains should be spared to render it healthy, comfortable, and attractive. The hygienic points to be attended to are that there be an abundant supply of fresh cool air and an effective withdrawal of vitiated air, just as in the hot rooms was done with the hot air; for the cold-air bath in the cooling-room is, in its way, as all-important as the bath of hot air. The freshness of the air is of equally vital importance, as much of the invigorating effect of the bath—that effect which to the minds of the unformed is *weakening*—results from submitting the heated skin to currents of cold air.\* In arranging any screens, or screen walls in the cooling-room, therefore, regard must be had to the method of ventilation, that there be no stagnant corners and recesses. The scheme of ventilation must be decided by the nature of the apartment and its position. In most cases the air is best admitted through the windows, fitted with fan-lights falling backwards from the top, and extracted by powerful self-acting exhausts at the ceiling level. In some positions extraction flues will have to be built, and, in others, flues of large area must conduct to the source from which the fresh air is drawn. Under certain circumstances a perfect supply of fresh air will not be obtainable without the aid of a powerful blowing fan-wheel driven by a motor of some sort. The means does not so much matter so long as the end be gained, and an ample supply of cool air obtained. A warm, close "cooling-room" is worse than useless. In such places the bather will break out into renewed perspiration, and lie perspiring for hours, and become greatly weakened thereby, with a good chance of taking a chill on leaving the establishment.

Cooling-rooms will always remain sufficiently warm in all weathers if they be in any ordinary relation to the heated apartments; but in the height of summer care is required to keep them sufficiently cool. Where simple, everyday precautions will not suffice, the air itself must be cooled either by passing it through a cold-chamber or over ice-boxes in inlet tubes, or through a waterspray. Only in exceptional cases, however, is it necessary to resort to such measures, as, contrary to the teachings of theorists, it has been found in practice that the proper temperature for the cooling-room of a hot-air bath varies in different states of the weather, and should not remain constant all the year round.

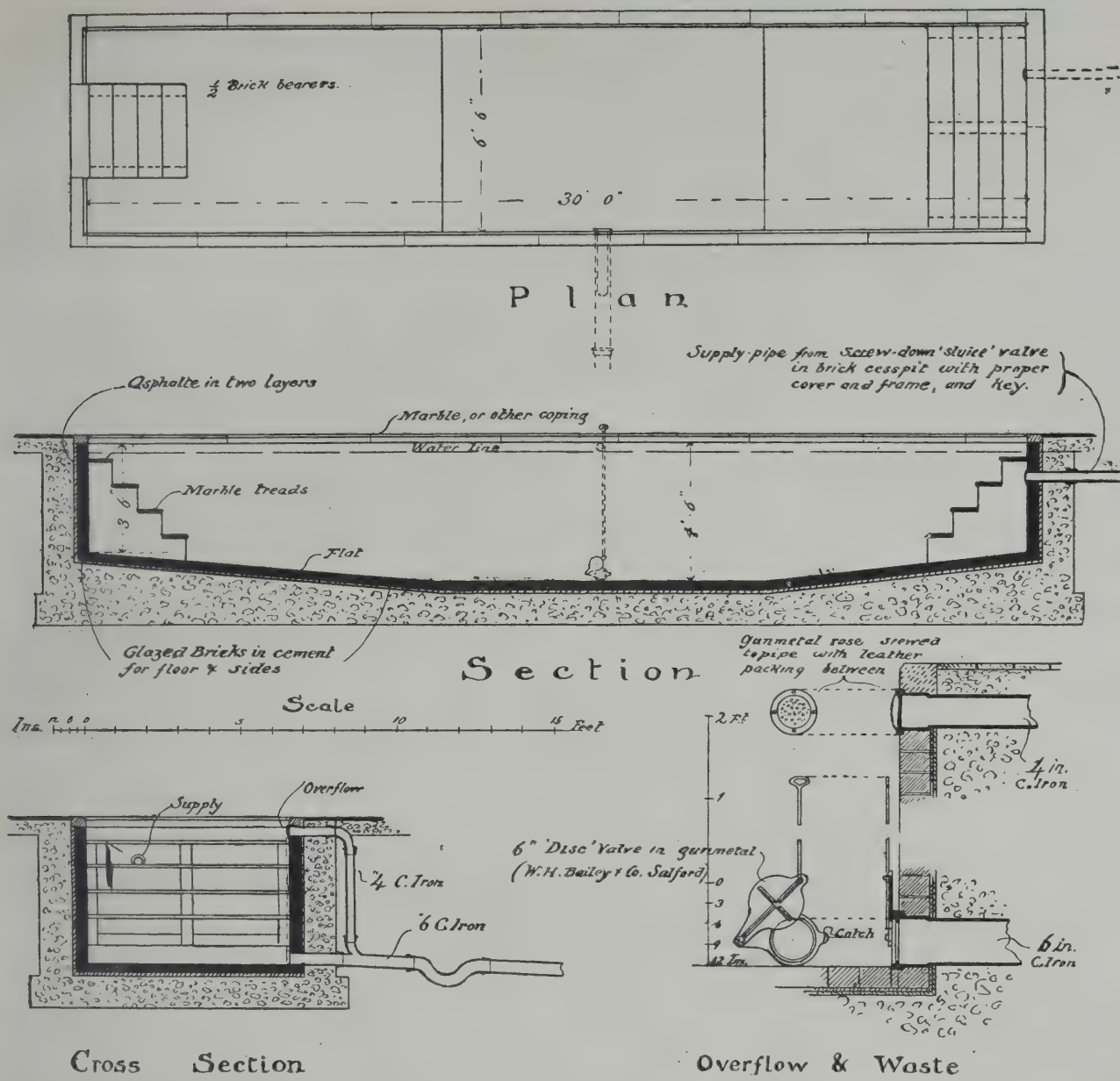
### CONSTRUCTIONAL DIFFICULTIES.

A few possible sources of difficulty may arise during the construction of a bath. At the outset, dampness may be feared in the basement. In such cases vertical layers of damp-proof material must be employed on the outside of the walls, or the latter may be constructed wholly of concrete, except for a facing of glazed brick. In the hottest of the hot rooms, dampness is impossible, as the heat will permeate the surrounding earth.

The construction of cavities and flues for the extraction of the vitiated air from the sudatory chambers does not ordinarily present any difficulties. If a bath be constructed in the lower floors at one and the same time as the rest of the building, the provision is easily made. So, also, in cases where the sudorific chambers are constructed at the back of the main building. But where the bath is adapted to an existing building, some scheming is requisite. Advantage must be taken of any suitable existing flues. It will, however, generally be necessary to construct a large shaft against one of the exterior walls of the old building, and into this to collect the vitiated air. In the case of a sudatory at the back of an existing building, the flues may run to the coping and be finished with ventilators or windguards, or they may be collected and run into a flue of large section bonded to the old back wall. Where, in cases as above, the walls are hollow the vitiated air may be turned into the space between the curtain light and the skylight—between the ceiling and roof. From hence it may be drawn by a patent extraction ventilator.

\* Not draughts. The ancient Romans, it is curious to note, would walk in the open air after the bath; and both the *Frigidarium* of the Romans and the *Mistabiy* of the Turks were, and are, open to the heavens.—R. O. A.





The flues might be turned into the same space, and the air similarly treated.\*

Fireproof floors over hot rooms may be of any design that is also heat-proof. The main point is to have a sufficient thickness of concrete, and that the iron joists and cross girders are well buried therein. Ordinary floors may be rendered heat-proof by partially filling the space between ceiling and floorboards with sawdust laid on boarding nailed to fillets on joists. The sawdust should be filled up to level of top of joists; over this a layer of thick felt, and the boarding above. This, however, is only a makeshift when compared with a solid floor of concrete.

Heat permeating other apartments and neighbouring premises is a frequent source of trouble to the builder of a Turkish bath, but is always the result of want of study of the subject on the part of the designer. The evil may be successfully combated if it be resolved that no hot room, shampooing-room, or lavatorium shall be constructed without a thick concrete floor above, and that the furnace chamber be constructed below the laconicum. Should the walls of the hot rooms adjoin in any part apartments where it is urgently necessary that the heat should be prevented from being transmitted to—they may be rendered heat-proof by building them hollow and filling the cavity with soot.

Double doors and lobbies must be employed to prevent the transmission of the heated air to rooms where its presence would be injurious. To keep the hot air of the bath-rooms from the cooling-rooms, &c., should be the great aim of the architect. Many baths are rendered quite

repulsive by what I may perhaps term the "sudorific smell" which assails the nostrils of the visitor entering the vestibule.

As regards thickness of walls, in constructing a bath in an old building, all that will be often necessary in some parts is to line the existing walls with a half-brick wall with glazed face, a cavity being left for the vitiated air. The walls of the hot rooms of a small bath, where in the basement away from main building, may be 14in., built with 2in. cavity, or, if preferred, 9in. with flues.

A hollow 18in. wall will suffice in a bath of ordinary dimensions, where the hot-rooms are built above ground and isolated.

Specifications, when alluding to cavity walls and air-flues in Turkish baths, must provide for their being neatly finished and truly and carefully constructed, and not left with lumps of mortar choking them up, as so frequently done in the case of the cavity walls in ordinary building.

Floors of ordinary-sized baths, where the soil is reliable, may be of 6in. of concrete, with mosaics or tiles laid in cement. The benches for reclining and shampooing must be built up from this with half-brick risers, with glazed fronts, with weathered marble slabs with rounded nosings, as illustrated in my last article.

The plunge-bath is at times a source of two difficulties—it may leak, and it may be below the level of drain. The first evil is the result of an error in design, or of bad workmanship; the latter is unavoidable. The following method of constructing a plunge-bath has been adopted with perfect success:—On the bed of concrete prepared for its floor, erect side walls of concrete, and on the floors and walls thus formed

spread two distinct layers of asphalt, covering all and running up to the underside of coping. Against the sides build half-brick walls in cement, with glazed face, and lay the floor with glazed bricks flat. The general principles of this construction I show in the accompanying illustration.

Where the bath is lower than the drain, all that can be done is to drain out as much as possible and pump the remaining water from a "sump" provided in the bath.

Glazing in the hot rooms requires care. The glass will expand considerably with the heat, and, what is more, if the furnace fire die out rapidly at any time, will contract and fracture. This difficulty, however, is the result of bad management, and not to do with the architect, unless, indeed, it be the result of improper fixing. Even moderate-sized sheets of glass should be carefully fixed in chamois leather with screwed beading, putty being wholly inadmissible. The sheets of glass should not be of too large dimensions. Rolled glass will be found the cheapest in the end, as inferior qualities, where homogeneity of texture is wanting, will crack and split in all directions. Lead glazing in small panes may be adopted for partitions.

Horizontal and inclined flues for conducting hot or cold air may be carried from point to point on rolled iron joints having tooled York slabs set thereon, the flues being constructed of 4½in. brickwork with glazed face internally, built in cement, and covered with tooled York slabs. Provision must be made, in such flues, for effective cleansing by means of iron, air-tight doors.

(To be continued.)

\* In my next article—on "Heating and Ventilation"—I shall explain by diagrams the methods of arranging extraction flues, &c.—R. O. A.



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## ILLUSTRATIONS

"JUSTICE" AND "PLENTY."—OAKDENE, FINCHLEY,—DEWSBURY TECHNICAL SCHOOL AND SCHOOL OF SCIENCE AND ART.—NEW CHURCH AT KILTIMAGH.—ASYLUM FOR DEAF AND DUMB CHILDREN, OLD KENT-ROAD.—SCULPTURED PANEL FROM TRAJAN'S FORUM, ROME.—A CORNER HOUSE AT HAMFSTEAD.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## "JUSTICE" AND "PLENTY."

These statues are by Mr. C. B. Birch, A.R.A., sculptor, and are for the Australian Joint Stock Bank, Sydney, New South Wales.

## OAKDENE, FINCHLEY.

THIS house has just been completed for Mr. J. Westwood Thompson. It is situated on about 4 acres of ground running down to the Dollis brook, and has extensive views all round. The materials used are Heather red-pressed bricks and Corsehill stone dressings, the upper stories and roof being covered with Broseley tiles. The staircase and hall are in wainscot oak, and the sitting-rooms are panelled with pine, painted. The builder is Mr. S. J. Scott, of Blomfield-street, E.C.—PERCY STONE.

## DEWSBURY TECHNICAL SCHOOL.

THE building, which is the outcome of the Queen Victoria Jubilee celebration in Dewsbury, is now in course of erection upon a commanding site in Halifax-road. The site is very convenient to the populous parts of the town, and is central to the out districts that are expected to make use of the institution. Besides the accommodation shown upon the small plans, provision is made for chemical laboratory and dyehouse. The materials used are Delph wall-stones from the Brighouse quarries for all external walls. The woodwork of committee-room, library, and secretary's office is to be executed in the best Baltic wainscot oak. All remaining work to be selected yellow pine, stained and varnished. The slates to be used are the best green slates from the Buttermere quarries. The works are being carried out by local contractors, under the supervision of the architect, Mr. J. Lane Fox, whose design, submitted in a competition of local architects, was unanimously adopted by the committee.

## KILTIMAGH CHURCH, IRELAND.

THIS church is about to be erected, with a new presbytery adjoining it, for the Very Rev. Denis O'Hara, the parish priest, on a county side site at Kiltimagh, to replace the older building which is possessed of no architectural interest. The ground-plan with the view will explain the arrangements of the church, which will be carried out in local-quarried stone, with dressed quoins and copings. Mr. William H. Byrne, of Suffolk-street, Dublin, is the architect.

## ASYLUM FOR DEAF AND DUMB CHILDREN, OLD KENT-ROAD, S.E.

THE old asylum premises in the Old Kent-road (so familiar to many from the fine trees in the forecourt), which were erected at the close of the last century, having been found to be in want of considerable repair, and being un-

adapted to the requirements of the modern system of teaching now pursued with the deaf and dumb, the committee of management decided to pull down and rebuild, rather than alter and amend, and accordingly the present building now occupies a portion of the site of the old. The new building—which is designed to accommodate 80 children on their election to the benefits of the charity, and is a sort of nursery for their early training before being drafted to the large establishment at Margate—is a plain and substantial structure of brick, with facings of red-pressed bricks and Bath stone dressings. The floors and staircases are of fireproof construction, by Messrs. W. B. Wilkinson. The corridor, class-rooms, and dining-rooms and dormitories are heated with hot water. The ventilation was carried out by Robert Boyle and Son. The contract for the whole of the works was in the hands of Messrs. J. and J. Greenwood; Mr. A. R. Mullins is the architect.

## SCULPTURED PANEL FROM TRAJAN'S FORUM, ROME.

AMONG the many specimens of the Roman antique which enrich the grand collections of the Lateran Palace Museum none exemplify the special characteristics of Roman ornamentation more fully than this unrestored panel of a frieze, which we illustrate to-day in photographic detail, from the Forum of Trajan at Rome. It is singled out in the "Grammar of Ornament" by Owen Jones as worthy of special attention, together with another corresponding example of the same period, exhibited also in the second gallery on entering the Lateran. Its design is thus alluded to particularly because the sculpture illustrates the Romans' favourite method of introducing the human form in conjunction with foliations and scrolls, terminating the body in foliage, which in turn branches off into conventional ornament. This style of composition, too, really formed the basis of the then universal method among Roman artists for their painted decorations. One scroll is made to grow out of another scroll, which generally encircles a flower or group of leaves, very cleverly exhibiting a power of drawing and skill in carving, though seldom adapted really to the ornamental accessories of strictly designed architectural forms. The acanthus is rendered with more naturalesque precision than in Greek work, and the leaves become more flattened out, laying, as it were, one over the other in close confusion. Instances can be quoted where this objection is not so evident as in others. Thus the fragments of sculpture from the Museo Bresciano are more elegant and refined than those from the Villa Medici. The Trajan panel here represented has another common feature to be noted as a favourite with the Romans—viz., the introduction of the cinerary urn, which forms the centre of the composition. So typical a specimen of work from so grand a period of historic art cannot fail to be of value to all students.

## COMPETITIONS.

TAMWORTH.—An adjourned meeting of the Town Council was held on the 19th inst., the Mayor presiding. The principal object of the meeting was to examine the various plans for the proposed new municipal buildings. Eventually, Alderman Shaw proposed that the plan of Mr. Joyce, of Stafford, be accepted, subject to any alteration the council might decide upon. This was seconded by the Mayor, and carried.

The work in connection with the restoration of Moberley parish church is being pushed forward with great vigour. Already the greater portion of the chancel and vestry has been taken down, and it is expected that building operations will be commenced shortly. The decayed beams and rafters which have been discovered show how greatly the restoration was needed. Mr. Crowther, of Alderley Edge, is the architect, and the builder is Mr. Brown, of Chester.

The foundation stone of a new church, to be erected at the village of Scotton, near Knaresborough, was laid on Thursday week. The church is to be erected from the designs prepared by Mr. Fowler, of Durham, architect. He estimates the cost at £1,000.

## SOCIETY OF ENGINEERS.

ON Tuesday the Society of Engineers visited the new precipitation works at Barking sewage outfall. They were received by Mr. Geo. Marshall, on behalf of Sir J. W. Bazalge, C.B., engineer to the Metropolitan Board of Works, and luncheon was provided by the contractors, Messrs. John Mowlem and Co.

At the present time the whole of the sewage of the metropolis north of the Thames is conveyed to Barking Creek by three culverts, each 9ft. high by 9ft. wide, and is, in the first instance, delivered into a covered reservoir divided into four apartments, and altogether extending over an area of nine acres. The sewage is stored in this reservoir during eight hours of each tide, and discharged into the river at high water at the top of the ebb. This reservoir is situated on the east side of the sewer, and immediately adjacent to the river bank.

The new works consist of covered precipitation tanks adjacent to this reservoir on the north side, and occupying the ground between the outfall sewer and Barking Creek, an area between ten and eleven acres.

There will be thirteen of such tanks, each 31ft. 6in. wide, and averaging about 1,000 long. Communications will be made between the outfall sewer and each of these tanks, each fitted with two penstocks, so that communication may be opened or shut off at pleasure.

The sewage will be admitted into each of the tanks in succession, and after being allowed to remain quiescent for a sufficient time to admit of the deposit of the solids in the sewage, the precipitation of which will be expedited by the admixture of 3·7 grains of lime and 1 grain of proto-sulphate of iron per gallon, the effluent will be run off over a weir which will fall the water in the tank lowers, so that the film of the effluent only will be taken off, and the tank emptied gradually so as to prevent any disturbance of the solids by the operation.

The effluent after flowing over the weirs (of which there will be ten in each tank) will pass into culverts carried transversely under the tanks and extended—some into the compartments of the existing reservoir—and some into a chamber under the outfall sewer through which, at present, the sewage is discharged into the river from the existing reservoir. When the level of the tide will admit, the effluent will be discharged through the chamber direct into the river, but when the water in the river is too high to admit of this the effluent will be conveyed by the other culverts into the several compartments of the present reservoir, and stored there until the level of the water in the river will admit of discharge.

When each compartment is emptied of the effluent, the sludge, which will be in a semi-liquid state, will be discharged through culverts passing under the outfall sewers into a collecting culvert, from which it will be conveyed by pipes into a receiving well or sump and pumped into a series of 12 tanks placed side by side and situate between the outfall sewer and the river. These tanks will each be 20ft. wide and 140ft. long, will cover an area of over an acre and a half, and, like the precipitation-tanks, will be covered so as to prevent nuisance.

The sludge will be allowed to remain quiescent in them so as to allow of a further precipitation, and the effluent water will be discharged over weirs into a culvert which will convey it into a store under the tanks, from whence it will be lifted and discharged through pipes to the liming station, there to be mixed with lime, which is used for precipitation.

The settled sludge remaining after the further precipitation will be discharged through culverts into a sludge store situated under the tanks, and will be lifted thence and conveyed by pipes along a jetty, and to a laning stage to be erected in the river, and the discharged into ships which will convey the sludge to sea. In the event of the ships being detained by stress of weather, there is a further store for sludge at a lower level, extending under the whole of the area occupied by the upper stores.

On the north side of these sludge settling tanks will be erected engine and boiler houses and workshops in connection, to contain engine and machinery for lifting the sludge into the



settling tanks, and the settled sludge into the ships, as well as for pumping the sludge effluent to the liming station.

The lime for assisting the precipitation of the solids of the sewage is introduced into the outfall sewers at a point about 700 yards and the proto-sulphate of iron about 530 yards above the precipitation channels.

The liming station will comprise a lime store, floors for slaking the lime, and six tanks for mixing the slaked lime with the effluent water from the sludge settling tanks or with sewage taken direct from the outfall sewers; an elevated lime-water tank or reservoir built above the lime store, and into which the lime-water will be lifted by pumps, for which machinery and the requisite engine and boiler-houses will be erected adjacent to the lime stores. From this elevated tank the lime-water will be conveyed to and injected into the sewage passing along the outfall sewers, through cast-iron injectors placed in the sewers.

There will be means of turning the lime-water into any one of the three lines of sewers and of regulating the supply by means of sluice-valves fitted to the pipes leading to the injectors. The injectors consist of cast-iron chambers 4ft. 6in. in length, 6in. wide, and 6ft. in height, fitted with a number of nozzles, through which the lime-water will be injected and mixed with the volume of the sewage as it flows past.

The iron-water station comprises timber sheds for storing the proto-sulphate of iron, a mixing shed in which the iron will be crushed and mixed with water, an engine-shed to contain engines and machinery for crushing the iron and mixing it with water, as well as for raising water for boilers and into mixing tanks. The iron-water will be conveyed by stoneware pipes, carried underground and along the top of the outfall sewer into a service tank, from which it will be carried by pipes into each of the three outfall sewers, and injected into the sewage through perforations in a pipe fixed vertically in each of the sewers. As with the lime-water, there will be appliances for regulating the supply of iron-water to each of the sewers, to meet the varying requirements of the discharge.

There will be a large settling-pond, covering an area of  $1\frac{1}{2}$  acres, situate near the river, divided into six compartments, each 60ft. by 60ft., and about 7ft. deep, into which water will be received from the river and allowed to settle; the clear water being afterwards filtered and used for the supply of the several boilers, for slaking the lime, and for mixing with the proto-sulphate of iron.

The works extend over an area of about 50 acres, the quantity of sewage to be dealt with will amount to about 90,000,000 gallons per day, and the quantity of lime to be used in precipitation to 23 tons per day.

Two contracts have been entered into for the execution of the works, one with Messrs. Mowlem and Co. for the general work, for £406,000, and the other with the Glenfield Company, of Kilmarnock, for engines and machinery, for £42,567.

#### CHIPS.

It has been finally decided, after many years' consideration, to construct a marine drive to connect the two cliffs at Ramsgate, at a cost of £50,000. A deputation waited upon the mayor of the town on Monday night, and urged upon him the desirability of the authorities proceeding with the work at once. It was stated, in reply, that favourable terms had been offered by the Board of Trade for the property required. A large model of the road was on view, showing the entire transformation of the sea front, including the removal of the harbour offices, the construction of a new quay for yachts, &c., and a new and improved approach to the sands and the London, Chatham, and Dover Railway.

Mr. E. H. Shorland, of Manchester and London, has recently supplied his inlet and outlet ventilators, amongst other places, to the following:—Fire brigade station, Oldham; new Wesleyan chapel and schools, Watersheddings, Oldham; and the Methodist Free Church Schools, Oldham; Messrs. Potts, Picup, and Dixon being the architects for the whole of same.

Under the direction of Mr. Blomfield, A.R.A., Mr. Harry Hems has just placed twelve more statues *in situ* at St. Alban's Abbey. There are now 58 of the 70 there.

#### WAYSIDE NOTES.

MY note of alarm at the possible action to be taken by the Corporation of the Church House in respect to the design of their proposed building appears to have been unwarranted. Although the corporation intend at first only to alter the buildings existing on the site in Dean's-yard, they have every intention of ultimately erecting a new "house" worthy of its objects. The hints thrown out by speakers at the recent conference in a marquee in Dean's-yard seem to point to a fine building in the near future. Lord Justice Cotton said that the site was not what the corporation hoped to show the world, but that for the present the existing buildings would serve as the Church House until they could erect one worthy of the corporation and of the purposes in view. For this it was stated large funds would be required. We may, therefore, look hopefully forward to the day when we shall take up our "B.N.," and find an announcement requesting us to compete for the new building—unless, indeed, the work be given to any architect in the meantime.

*Punch's* design for the Church House will have been noticed with amusement by many. In the main it consisted of a tower, in which different parties were to be arranged in varying altitudes, according as they were "high" or "low" Churchmen. The Evangelical section in the lower portion of the tower, had very narrow windows, as, it was explained, very little light is admitted at this elevation. The Broad Churchman's apartments above were fitted with spacious windows, having a liberal outlook, whilst the High Churchman was to be located in the roof with comparatively narrow windows. I can only suggest, by way of an improvement, that gentlemen of the Church Association stamp should be accommodated in the cellars, where the light of day would be excluded altogether.

"The Church Association's last move" formed the title of an article in the *Spectator* of last week. Said the writer: "The attack upon the reredos of St. Paul's is the expiring effort of the party, well-meaning and sincere, however short-sighted and narrow-minded, which, in its day of power, placed Shakespeare under ban, and forbade tailors to sit cross-legged, for fear of superstition, and sent mothers to prison for kissing their children on Sunday. The spirit of the age and the common sense of the public are against the Church Association in this matter. Those who have made war on the St. Paul's reredos because it contains the figure of the Saviour on the Cross do not propose to destroy all the painted windows on which the Crucifixion is depicted. How do they justify this inconsistency? Their spiritual progenitors were more logical. They saw no difference between painted windows and sculptured marble, and they destroyed both with indiscriminate ruthlessness. The mind which is stupid enough to pay Divine worship to an image in sculpture is not likely to recoil from worshipping the same image in painted glass or on canvas." We do not want a modern Puritanical attack on new churches. The bigoted old Puritans have done quite enough in old buildings. Further argument on this subject, however, is superfluous, since, as you observe, the Church Association have no chance of winning the day. The legality of the Exeter and Denbigh cases—very similar to the present one—having been established, there seems little reason why the reredos of St. Paul's should be mutilated at the hands of the modern descendants of those persons who, in days gone by, destroyed a few acres or so of beautiful stained glass, and chopped off the heads of some thousands of statues, the gems of workmanship and sculpture of those ages, which, as the Dean of Gloucester says, we are pleased to call Dark.

"Practical Architecture" should be well read. The series you are giving is just what is wanted by students—and by a good many more than students; and the excellent illustrations will render them of the greatest service to such. I really think these articles should supply a long-felt want. Whilst on the subject of illustrations, I should like to express my indebtedness for the photo-tints of Ely and Lichfield. One feels infinitely thankful for anything that will take one's thoughts off the

professional side of architecture for a moment, now that the air is thick with scandals and the name of "architect" appears to be synonymous with business ways which, to say the least, are peculiar, like those of Ah Sin. Thanks to the guilty ones and the M. B. W. inquiry, architects are now on the stock list of the comic papers. "There being always some difficulty in drawing the line," said one of these journals last week, "the architects at the Metropolitan Board of Works draw three, so as to make sure of one being correct." This is certainly not a very brilliant joke, but may be taken as a type of the class.

Having been staying for two or three days in the Isle of Thanet, I have taken the opportunity of refreshing my memories of Canterbury Cathedral, and visiting other "lions" of the interesting old city. I was somewhat curious to find out what had been done with the bones of St. Thomas-a-Becket, as the remains recently discovered were alleged to have been. With this end in view, I submitted to the usual ordeal of following a verger through the choir, chapels, cloisters, and crypt, and listening to his old, old story. I find that the bones have been placed in a rough sarcophagus in the crypt of Becket's "crown." The theory that they are in truth the remains of the saint does not seem to find very great favour with the worthy vergers. The old gentleman who showed us round seemed very little inclined to give ear to the assertion, from whatever quarter it comes. Neither, I can only conclude, does anyone else, or the bones would not have been shovelled into a clumsy coffin, cemented up, and left to the darkness and dankness of their present position.

St. Martin's Church, at Canterbury, generally supposed to be the first Christian temple in England, I had hitherto left unvisited; but on Monday last I critically inspected the exterior and interior. There seems little reason for doubting that the priest's door at this church is the oldest of its kind extant. So far as I could judge, the jambs are of Roman workmanship, while the arch above has been turned by Saxon hands, as it is not constructed of shaped voussoirs, but long, parallel-sided stones kept in their place by the cementing material. At any rate, I fondly hope that I have seen the oldest priest's door, as I am particularly interested in such features. They are often of such delicate proportions—veritable architectural tit-bits. The other interesting object at St. Martin's is a font of reputed Saxon design, whose mass and outline resembles nothing so much as a homely water-butt. Its appearance certainly excuses one's assigning it to so remote a date.

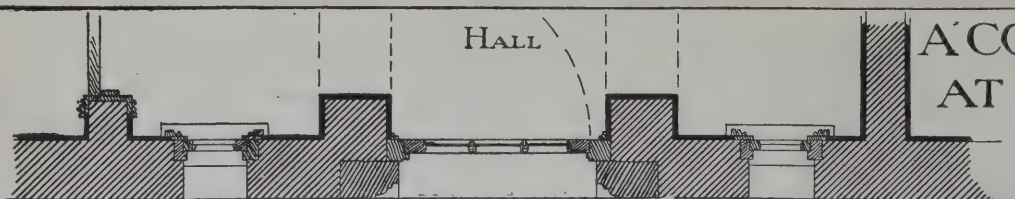
St. Augustine's College I also visited for the first time. One cannot but think that the late Mr. Beresford-Hope secured this site not a moment too late. It is sad to remember what a grand old building was destroyed when, early in the present century, the church of St. Augustine's monastery was pulled down. Old prints in the college library show that a comparatively small portion of the church remained then; but the towers of fine Norman work existed. All that now remains indicates that the architecture of this building must have been of a singularly massive type. The ruined base of the north tower still remains, as also does a portion of the north aisle. In some places fragments of tile pavement have been unearthed, and other curious things might be found if some of the more architecturally-inclined students would excavate a little in their spare hours. A small hole or two they have scraped in places; but want of perseverance is only too plainly evidenced. This is not to the credit of those who have attempted to discover fresh remains. The obstacle to further progress appears to be a layer of stones from the old building—the result of falling arches and piers. If I were one of those who have thus easily been disheartened I would quickly fill up the insignificant holes that have been scratched in the soft earth, and not leave them to be unintentionally pointed out to the visitor as monuments of apathy. GOTH.

The Plumbers' Company have made a grant of five guineas, to be awarded as prizes to the students attending the plumbing classes at the Polytechnic Y.M.C.I., London, for the session 1888-9.



# A CORNER MIDDLE AT HAMPSTEAD.

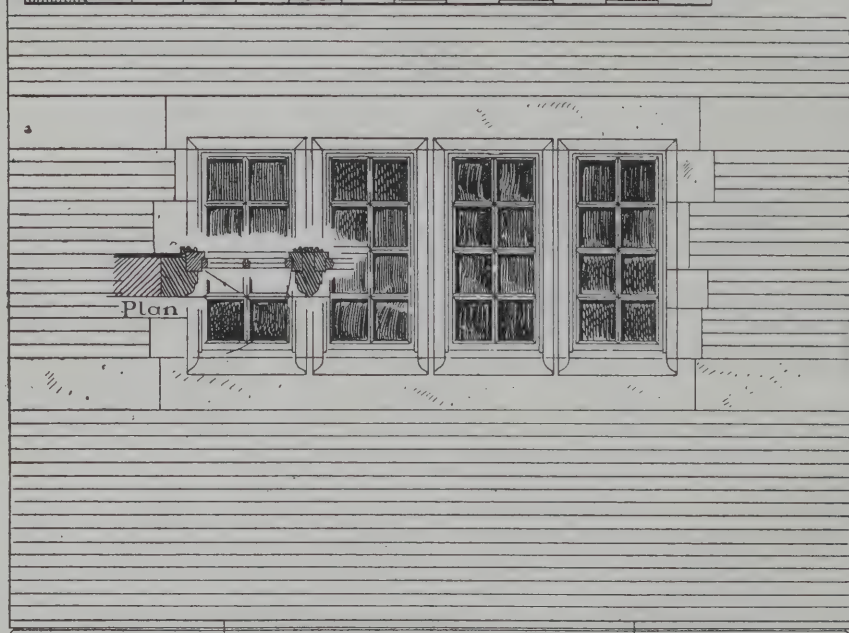
Maurice B. Adam



Principal  
Entrance

Plan of Porch

Scale of feet  
12 6 0 1 2 3 4 5 6 7 8 9 10 11 12 FEET



Plan

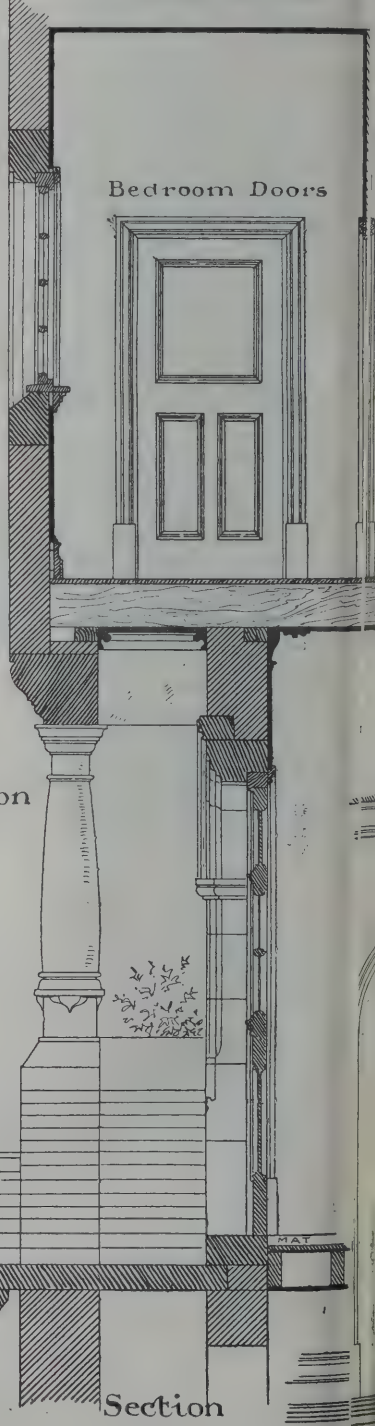
Elevation



GROUND LINE



Reception Room Door  
MOULDED BOTH SIDES



Bedroom Doors

Section



# ASS HOUSE

Architect

## DETAILS

PREPARED FOR ILLUSTRATION

CUT BRICK CORNICE

Part Plan of  
Windows

Section

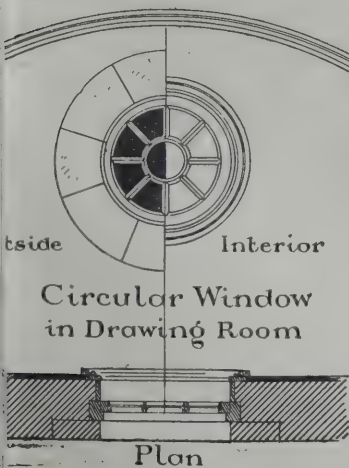
Section through Bay

Elevation

Drawing Room Bay

Arch to Bay  
Window &  
Alcove recess

Nº 4





# PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—III. By HENRY LOVEGROVE, F.S.I., Surveyor.

## NOTES ON BRICKLAYER.

BRICKWORK is measured superficially, and the thickness of wall is written against the dimension, thus :

20.0	15.0	2½ B. foot
9		
20.0	180.0	1½ B. wall
9.0		
3.0		
3.6		Brickwork
10.0		

The latter item is taken cube because it is the rule to do so for thick or irregular walls, angle chimney breasts, and the like. The whole is reduced, as the abstract shows, to the superficial rod of 272ft., 1½ brick thick.

Measure the walls, first dividing the various thicknesses, and afterwards take all projections, such as chimney breasts. Any portions in cement are taken as "brickwork extra only in cement," unless the quantity is very large.

The publication of the dimensions for this trade *in extenso* would tend to confuse rather than to instruct the student; but in some simpler building following, I shall be able to illustrate the whole process, and enter more fully into the details of labour on brickwork. The form of abstract is complete, but in some cases the first figures only are given to avoid repetition.

## BRICKLAYER.

Reduced brickwork in mortar, including all rough cutting.

1 bk.	1½ bk.	Deduct.
42.4	10.0	1 bk. 1½ bk.
15.6	10.7	7.6 35.9
	133.2	

Extra on ditto for being built in cement.

1 bk.	1½ bk.
-------	--------

Half-brick wall in cement.

56.3	Deduct.
442.1	37.6

Half-brick trimmer arch in cement
7.0
7.0 Vaulting in two half-brick
6.7 rings in cement.
30.0
78.9

Extra to red brick facings as described.

2356.7	Deduct.
	330.10

Rough relieving arch over lintel.

3.5 Extra to neatly-axed segmental arch in stocks.

14.10 Do. semicircular do. do.

10.10 Do. elliptical do. do.

36.0 Do. semi do. in two half-brick rings.

8.5 Do. circular do. do.

16.0 Ex. to cut, rubbed, and gauged flat arch in red bricks

and pointing.

19.1 Do. segmental do. do.

39.1 Do. do. in two half-brick rings.

10.6 Dampcourse as described.

390.9 Portland cement weathering to cornice.

26.8 Mitres to do. 9in. wide.

4 Extra to fair face and limewhite walls.

112.9 Cleaning off and pointing soffit of arch and twice lime-

white.

148.9 Paving of 6in. red tiles bedded and jointed in cement.

171.0 Run. Labour fair cutting to skewbacks, &c., in brick-

work.

123.0 Deduct.

45.0 As last circular over arches.

23.0 Do. to fit stone moulding, 9in. girt.

3.4 Edge of 6in. landing cut and pinned in cement.

26.2 Extra to red brick moulded necking one course high in

cement.

34.8 Mitres.

8 Do. do. string, &c., two courses, do. do.

15.2 Mitres.

4 Do. do. do. three do. do.

43.8 Mitres. Obtuse mitres.

84.10 8 6

## Stopped ends.

2 Deduct.

21.6 Do. mitres.

Do stopped ends.

2 Do. obtuse mitres.

6 As before, six courses high.

35.6 Mitres.

2 Mitred returned stopped ends.

2 Extra to ornamental vertical projection 6in. wide. 2½

projection over gables.

5.9 Portland cement weathering to 1 course oversailing.

49.10 Mitres.

12 Rake wedge and point flashings in cement.

80.0 Do. stepped do.

29.0 50.0

5.6

## NUMBERS.

Frames, bed and point.

Ends stone steps, &c., cut and pinned.

12 End iron handrail cut and wedged to wall.

1 Fair cuttings in red brick facings to ends of steps.

12 Extra to red brick moulded scroll, 1ft. 11in. on face,

3ft. 6in. high, as sketch, including all cutting.

2 Extra to rough relieving arch over chimney bay in

cement.

1 Flue, parge and core.

1

1

1

1

## BRICKLAYER.

£ s. d.

The bricks to be the best hard square well burnt

stock bricks

The mortar to be composed of clean sharp sand

and best stone lime, in the proportion of 3 to 1...

The cement to be the best Portland

Rds. ft. in.

44 136 Supl. Reduced brickwork in mortar,

including all rough cutting.....

1 Supl. Extra only on do. for being

built in cement

1,191 Supl. Half-brick wall in cement.....

60 Supl. Do. trimmer arch in do.

179 Supl. Vaulting in two half-brick

rings in do.....

6,605 Supl. Extra to red brick facings

finished with a neatly-ruled

weathered joint

40 Supl. Do. to neatly-axed segmental

arch in stocks set in cement and

neatly pointed

190 Supl. Do. do. semicircular do.

do. do.

109 Supl. Do. do. elliptical do.

do. do.

9 Supl. Do. do. semicircular do.

do. in half-brick rings

16 Supl. Do. do. circular do.

do. do.

42 Supl. Do. to cut rubbed and

gauged flat arch in red bricks set

in putty and neatly pointed.....

64 Supl. Do. do. segmental do. do.

14 Supl. Do. do. semicircular do. do.

11 Supl. Do. do. segmental do. do.

in two half-brick rings

Yds. ft. in.

581 Supl. Damp-course of two courses of

stout slates laid breaking joint in

cement

74 Supl. Cement narrow weathering to

cornice. No. 16 mitres to do. 9in.

wide

18 Supl. Extra to fair face and twice

limewhite or colour walls

17 Supl. Do. to cleaning off and pointing

soffits of arches and twice lime-

white

49 Supl. 6in. red tile paving bedded and

jointed in cement

263 Run. Labor to fair cutting facings ..

172 Run. Do. do. circular over arches do.

4 Run. Do. do. to fit stone moulding

9in. girt.....

37 Run. Edge of 6in. landing cut and

pinned in cement

50 Run. Extra to red brick moulded

necking one course high in cement

No. 12 mitres to do.

63 Run. Extra to red brick moulded

string three courses high in cement

No. 12 mitres to do.

36 Run. As last six courses high

No. 2 mitres to do.

2 mitred and returned stopped ends

6 Run. Extra to ornamental vertical

projection 6in. wide, 2½in. projection

over gables.

50 Cement weathering to one course

oversailing

No. 12 mitres to do.

151 Run. Rake wedge and point flashings

in cement

100 Run. Do. do. stepped do do.

No. £ s. d.

42 Frames bed and point

2 Two-light do. do.

8 Three do. do. do.

1 Four do. do. do.

1 Large frame 5ft. 0in. by 16ft. 6in. do.

1 Door frame with side lights 8ft. 6in. by

9ft. 6in. do.

50 Ends of stone steps cut and pinned.....

2 iron handrail cut and wedged

12 Labour fair cutting in red brick facings to

ends of steps

2 Extra to red brick moulded scrolls 1ft. 11in.

on face 3ft. 4in. high, as sketch, including

all cutting

14 Do. to rough relieving arches in cement

over chimney bars

14 Flues, parge and core

14 Lengths of 9in. drain-pipe as chimney-pots,

bedded and launched up with plain tiles

and cement

8 Labour and materials, setting register

grates

1 Do. do. range to 2ft. 3in. opening

1 Do. do. kitchener to 5ft. do.

24 Terracotta air bricks 9in. x 3in., and building

in channel through wall 18in. thick...

11 Extra for rough relieving arches in two

half-brick in cement over lintels 4½in. on

soffit, and average 4 3 long

13 Do. 9in. soffit 4'4 do

2 Do. 18in. do. 4'3 do

8 Kite's patent ventilators, 15s. p.c., and

fixing.....

1 Glazed stoneware sink, 3ft. 6in. by 2ft., and

fixing on brick walls

2 Chimney-pieces formed in Portland cement

to average 3ft. 6in. opening, 1½ deal shelf.

Carried to summary.....

## WATER ENGINEERING.\*

THE storage and conveyance of water for the supply of towns and other purposes call for a large and varied knowledge on the part of the engineer. Not many in the profession have had the opportunity of acquiring a practical knowledge of hydraulic engineering in its various branches, and few books have been published on the subject. Mr. Charles Slagg, water and drainage engineer, Associate Member of the Inst. of Civil Engineers, has written a useful little book on the subject, which has appeared in a series of articles on the water question in the BUILDING NEWS. At the request of several readers, the articles have been reprinted, with much additional matter. The preliminary sections are devoted to storage reservoirs, embankments, and kindred details of a practical nature. The failure of reservoir embankments—notably, the Bradfield and Holmfirth—is noticed, and the causes of the slips. The quantity of water to be stored is considered at some length.

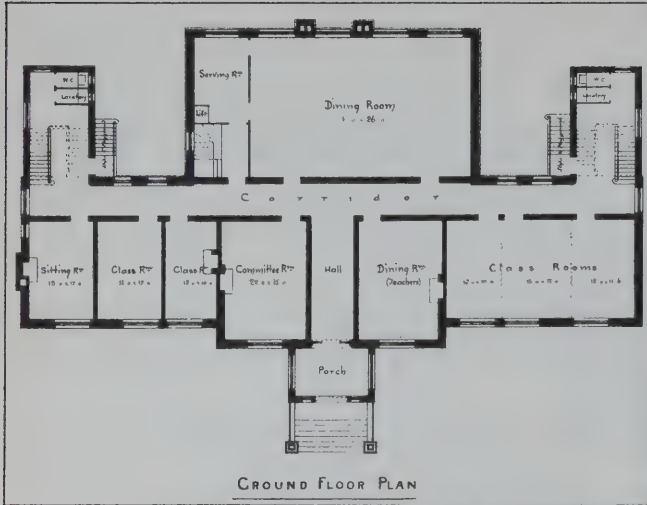
Mr. Slagg enters into the various conditions, such as rainfall, absorption in ground, evaporation, &c., that have to be considered, and gives a practical example of the mode of dealing with the subject. The experience gained by observation has been that in order to equalise the flow of water during three or four years of least rainfall, the capacity of a reservoir ought to yield about 120 days' supply where the rainfall is frequent, as in the western side of the country, and 240 days' where it is less frequent, as in the eastern side. The details of reservoirs are discussed; the reader will find references to the opinions of eminent engineers. Some practical remarks are given as to the length of waste-weir per 1,000 acres, and the drainage area; also as to the cost of reservoirs, the concrete for embankments and dams, and other details. Stream gauges, rainfall, conduits, head of water, pressure, strength of cast-iron pipes, the rules for calculating the water flowing down a river channel, are valuable sections of the book. Water power, and the various forms of water wheels, are discussed. In the concluding section the author deals with the important question of county boards and watershed areas, and the maintenance and repair of the banks of a river. The necessity of forming district watershed areas is evident for rating. Where the boundaries of the counties follow the watershed lines there is no difficulty, but where these run through parts of counties only there would be. In this case Mr. Slagg says the principle of the majority might be acted on—"either a majority of votes or the greater part of the rateable value of property within these outlying parts. The inhabitants, if any, of

\* Water Engineering: A Treatise on the Measurement, Storage, Conveyance, &c., of Water. By CHARLES SLAGG, Water and Drainage Engineer, Associate M.Inst.C.E. London: Crosby Lockwood and Son.



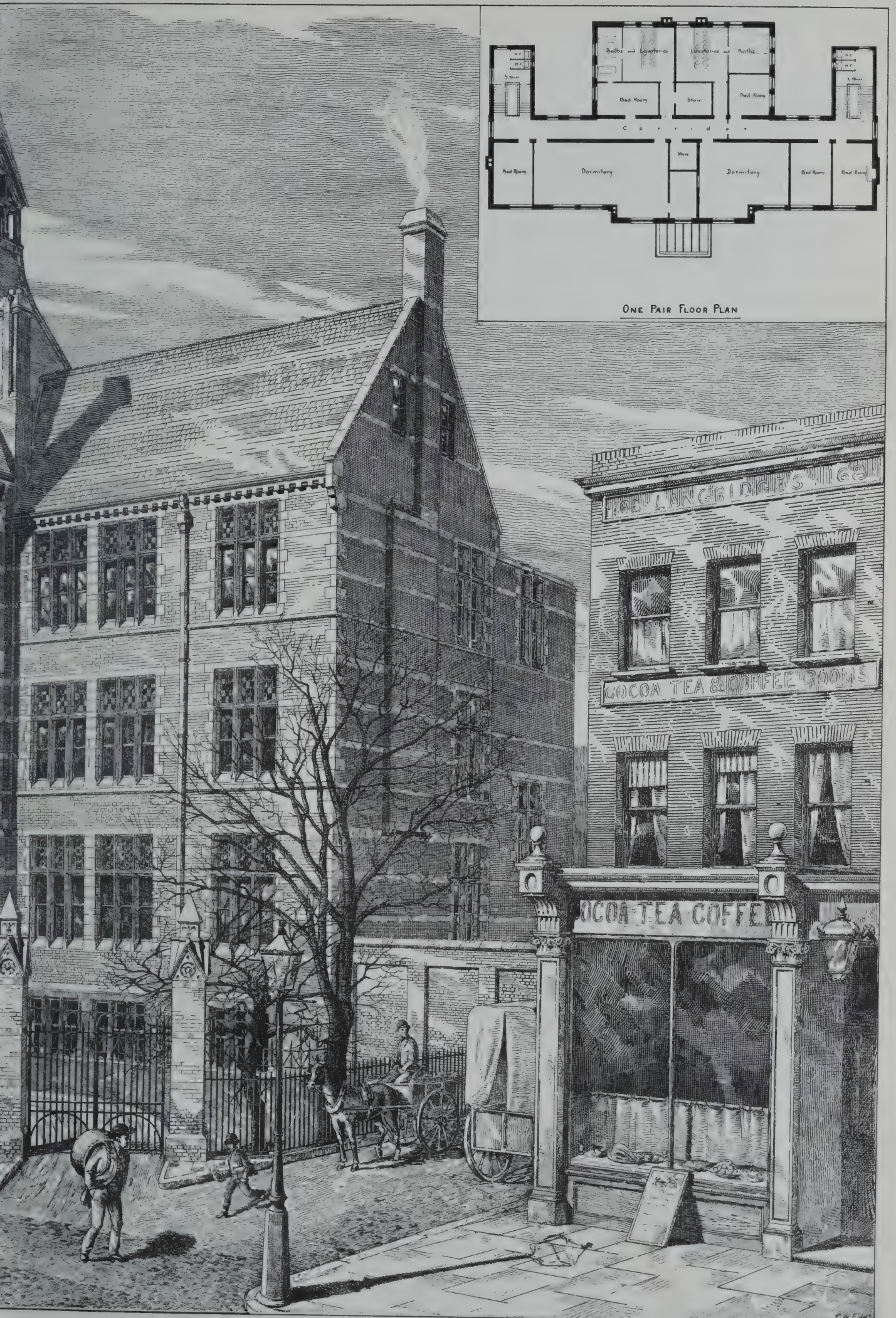








JULY 27. 1888.













THE BUILDING NEWS, JULY 27. 1888.



DEWSBURY TECHNICAL SCHOOL AND SCHOOL OF SCIENCE AND ART

J. LANE FOX, ARCHITECT, DEWSBURY.

Photo Lithograph by James Aikman, 6, Queen Square, W.C.









SCULPTURED PANEL IN THE LATE



s. JULY 27. 1888.



"PHOTO-TINT", by James Akerman. 6. Queen Square. London. W.C.

MUSEUM FOUND NEAR TRAJAN'S FORUM











THE BUILDING NEWS, JULY 27. 1888.



OAKDENE, FINCHLEY.

"Photo-Tint", by James Akerman, 6, Queen Square, London, W.C.





"JUSTICE."

AUSTRALIAN JOINT STOCK BANK, SYDNEY.  
C.B. BIRCH, A.R.A. SCULPTOR.



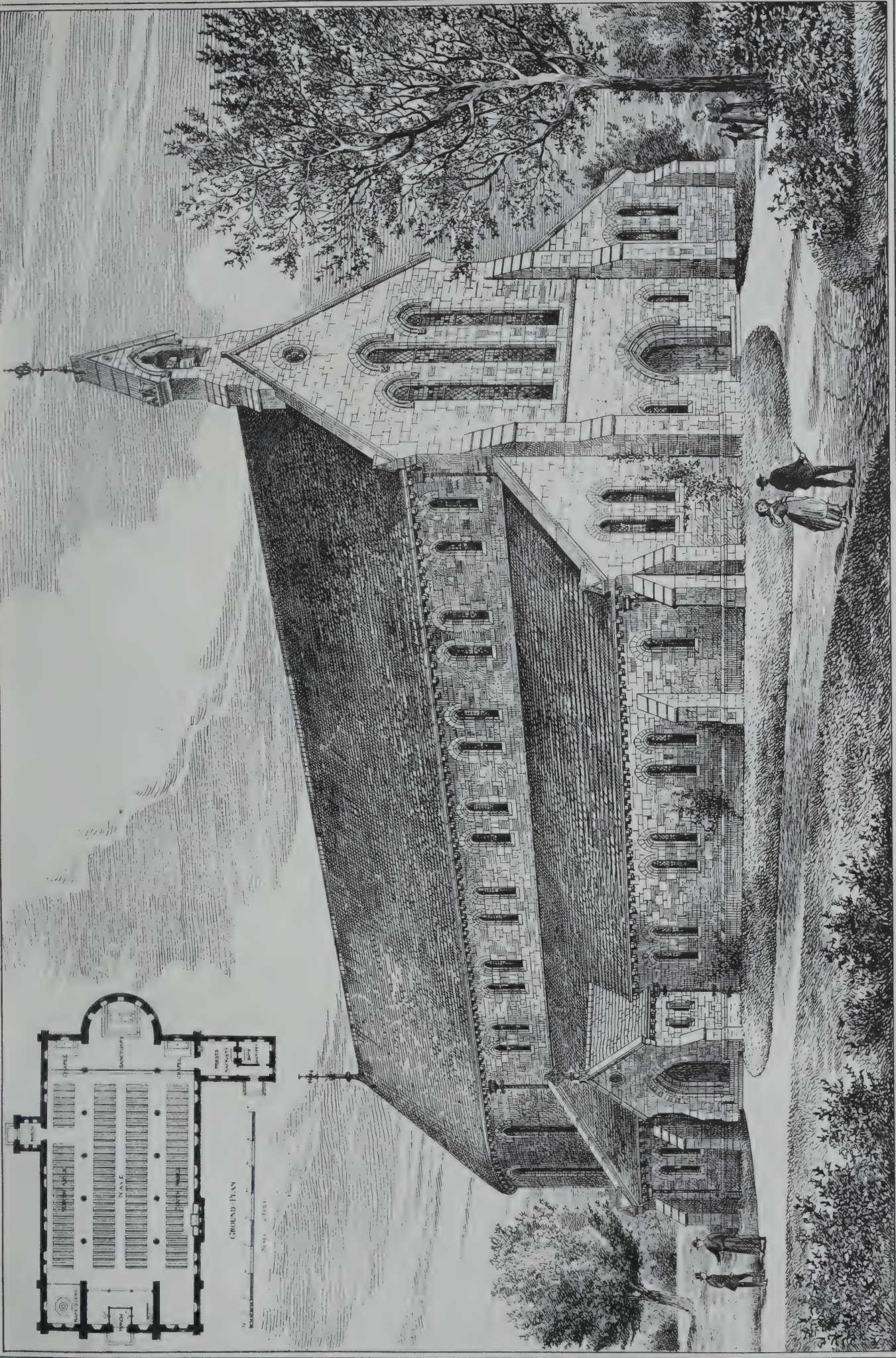
"PLENTY."

"PHOTO-TINT" by James Akerman, 6, Queen Square London, W. C.









New Church at KILTIMAGH for the Very Rev<sup>d</sup> DENIS O'HARA P.P.

William H. Byrne Architect DUBLIN







such parts might have the choice, to which county they will contribute, for the amount would be comparatively small." A still more difficult question is to determine the liability where the river forms the boundary or the centre of its course in this case. The author makes some sensible remarks on this subject. He says, "Where the boundary is, and must remain, in the centre of the river, it may probably be found advisable to give control of both banks to one authority, or half the whole length to each adjoining one. A post on each bank directly opposite each other, distinctly marks the division of jurisdiction, while the centre of the river is but a vague and uncertain division, and even if the two adjoining authorities could always agree to carry on the work of protection or repair of the banks, so that no injury should be done by one to the other side, there are other though less important difficulties which would arise out of such a boundary, irrespective of any question concerning the banks." As Mr. Slagg says, many advantages would result if the county boundaries were made coincident with the watershed lines, which can be accurately determined. The book will be found a thoroughly practical one, the work done by water-wheels, and the modes of calculation, service reservoirs and tanks, floods, and the means of relieving lands from them, are considered.

## Building Intelligence.

**BOOTLE.**—A vacant space abutting on to the Liverpool and Southport line and having a frontage in Oriol-road, has been secured by Messrs. F. W. Soames and Co., brewers, of Wrexham, as a site on which they purport constructing a large general depot. The façade will be of a substantial character, the Liverpool and district agent's offices occupying the ground floor, whilst the rear of the building will be so constructed that the greater portion of the loading and unloading will be done on the railway platform. The new building will be ready at the beginning of the new year, and will, when completed and in working order, cost about £15,000. The architect is Mr. Doyle, and the greater portion of the work will be carried out by Messrs. Dransfield and Smith.

**BRAUNTON.**—The grand old oak roof of the church of St. Brannock, at Braunton, near Barnstaple, has just been restored under the direction of Mr. William White, F.S.A. The length of the nave is nearly 80ft., and, being a span of 34ft. without a tie beam, the roof had spread as much as 24in., partly slipping upon the walls, and partly carrying the walls with it on each side, to the extent of from 8in. to 10in. The rafter couples have been drawn together one by one, and repaired with new English oak piece by piece, and secured with iron ties. The plaster ceiling put up some years ago has been removed, and the roof boarded beneath the new slating. The old carved bosses have been replaced with the moulded ribs, some of which have been renewed. One large boss in the centre of the roof represents the ancient legend of St. Brannock, having for its subject a sow with a litter of pigs. The Saint was told that he would meet with these, and that he should erect his church on the spot where they should rest at night. The roof is of the 15th century. The bells also have been rehung.

**CATERHAM.**—The Duchess of Albany distributed the prizes to the children of the Warehousemen's, Clerks', and Drapers' Schools at Russell Hill, Caterham, on Saturday, July 7. This institution has been honoured by royal visits—the foundation-stone was laid by the Prince of Wales, the patron of the schools; the addition which is known as the Leaf Memorial wing being inaugurated by the Princess Louise and the Marquis of Lorne in 1878. At present certain works and decoration are being performed at the institution by Messrs. Wall Bros., of Kentish Town, and the fine dining-hall has been renovated, and two 48in. exhaust ventilators have been placed in the roof. The works are being done under the superintendence of Mr. J. Kingwell Cole, M.S.A., architect, of 28, Mount-street, Grosvenor-square, W.

**DARTMOUTH.**—The famous old church of St. Saviour's at Dartmouth is now being restored from the designs of Messrs. Ashworth and Sedding, joint architects. The work at present is confined to the chancel. The vestries are being enlarged and the chancel galleries taken down. The chancel windows are mostly new. There will be new stalls in carved oak, and the organ will be placed in the north chancel transept. All the old latten memorials in the chancel are being carefully preserved. There is a new oak roof. The carving of the roof is entrusted to Mr. Harry Hems, of Exeter. The exterior masonry is, in the main, of Dartmoor granite and Wadstray stone. The general contractor is Mr. Rundle, of Kingsbridge.

**HALIFAX.**—The new buildings which have just been completed in Waterhouse-street, Halifax, for the Yorkshire Penny Bank were opened on Monday afternoon. The new premises have been built from the plans of Messrs. Perkin and Bulmer, architects, of Leeds, and the general design is Early Gothic. There is a frontage of 55ft., with basement, ground floor, and three upper stories. The ground floor and basement will be used for the purposes of the bank, while the upper floors will be let as offices, there being several suites. The bank itself is appointed with walnut fittings.

**HARROGATE.**—The memorial stone of the New Town Mission Hall, Harrogate, was laid on Thursday, July 19th. The buildings consist of a hall 48ft. by 32ft., and 45ft. across transepts, having porch and vestibule, with octagonal tower rising 40ft., in which is placed stairs to gallery; on ground floor of tower are two vestries. The walls are of yellow sandstone to the plinth level, and blue wall stones and white dressings above, with red Broseley tiles on roof, which is over 25ft. to collar beam, having Boyle's concealed roof ventilators. Accommodation is provided for 350 persons, at a cost, with missioner's residence, of £1,450. Mr. J. Dickinson is the contractor, and Mr. T. Butler Wilson, of Leeds and Harrogate, the architect.

**WOLVERHAMPTON.**—On Thursday week a private inspection of the new Dunstall Park racecourse, Wolverhampton, was made. The area is about 130 acres. The new buildings, which are elaborate in design, are situated on the south-east side. There are three stands, with their appurtenant buildings. There are, first, the saddling and weighing rooms, and next to these are situated the jockey and press stand. This building is furnished with lavatories, refreshment, and writing rooms, and on the balcony at the top are arranged two divisions for the jockeys and the representatives of the press. There will also be a railed enclosure in front. Next to this is situated a post and telegraph office, and a few yards further is the grand-stand, fitted up with every necessary requirement. The next structure is the ordinary stand, capable of accommodating 1,500 persons. From the winning post there will be a run in of a quarter of a mile to the railway arches and back along the brook which runs in the rear of the buildings. The erection of the buildings is being executed by Mr. H. Willcock, builder, Wolverhampton, whose contract is nearly £5,000; and the making of the new six-furlong course and other earthworks has been carried out by Mr. A. Turner, of Coseley.

On Sunday, July 22nd, a very large chiming clock was started in St. Peter's Church, Hindley, near Wigan. The clock has four dials, each six feet across, of very chaste but simple design; the quarters are chimed upon four bells, and the hours struck upon the largest bell in the tower. The movement is constructed with every modern improvement, so to maintain perfect accuracy, and chiefly to the designs of Lord Grimthorpe. It has a gravity escapement with a compensated pendulum. The work has been carried out by John Smith and Sons, Midland Clock Works, Derby, who have also in hand a similar but somewhat larger clock for Rawtenstall Church, Lancashire.

The shareholders of the Airedale Co-operative Building and Manufacturing Company, Limited, have held their fifty-fourth half-yearly meeting. The secretary read the report and balance-sheet, which showed the society to be in a sound position. The net disburseable profit was £222, which will pay a dividend of 2s. 6d. per share.

## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

## NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX, XL, XLI, XLIV, XLV, XLVII, XLVIII, XLIX, L, LI, LII, and LIII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—J. F. and Co.—B. S. and Co.—B. L. Co.—B. of L.—T. G.—T. C. H.—S. P.—C. H.—L. W. and V. Co. J. C. and Son.—H. S. Co.—D. S. Son and Co.

A. F. SOMERVILLE. (We have asked the makers of Field's flushing tanks to send you particulars.)—X. AND F. G. E. (Mr. Middleton defends his statement, which he maintains, although contrary to generally-received opinion, is correct. He will reply to you both in a footnote to his next article.)

## Correspondence.

### RESTORED FONT AT ST. MARY CHURCH, NEAR TORQUAY.

To the Editor of the BUILDING NEWS.

SIR,—A few days ago, whilst staying in Devonshire, I made a long journey especially to see the old Norman font at St. Mary Church, near Torquay, with the existence of which I had long been familiar from description. Imagine, then, my disgust, on finding that it had been restored in the worst possible taste.

The old font is cylindrical in shape, and decorated with a series of sculptured medallions representing a hunting scene, together with other subjects of the greatest interest to the antiquary. Of course the rational treatment for such a font, if it required meddling with at all, would have been to place it on a simple base corresponding in style with the rest, and not to have interfered in any way with the old work. Instead of this, however, the original font has been surmounted by a hideous new top, and the old bowl surmounted by arading of feeble design. The pillars of the arading come so close to the bowl within, that the sculpture is almost entirely hidden, so that it is quite impossible to take a satisfactory photograph, drawing, or rubbing. The recessed portions of the carving have been filled in with a brown substance resembling Roman cement, with what object it is difficult to imagine, as the disfigurement produced thereby is very great.



Vulgar so-called restorations of the kind just described are calculated to bring the utmost discredit on the architectural profession generally, and some attempt should certainly be made to put a stop to them by those who have its welfare at heart. I would suggest that the ecclesiastical authorities should step in and prevent incompetent architects from making havoc of our ancient buildings, and insist that with regard to purely archaeological matters a committee of experts should be consulted.

It is not now too late to strip the fine old Norman font at St. Mary Church of its absurd modern additions, and I hope that public opinion may be brought to bear upon the persons who are responsible for having committed this act of desecration, so as to compel them to have it brought back again to its original state. The font is now all that remains of the old church, which was entirely pulled down, although it had a good tower and other features of interest.

According to Murray's "Handbook of Devon" (p. 158), the architect of the new building was Mr. S. W. Hugall.—I am, &c.,

J. ROMILLY ALLEN, F.S.A. (Scot.)  
20, Bloomsbury-square, London, W.C.

#### ARCHITECTURAL ANTIQUITIES OF THE ISLE OF WIGHT.

SIR,—May I address myself to the readers of your paper? I am getting together the architectural antiquities of the Isle of Wight, and should be glad of any assistance in the way of drawings or notes, which would be *duly acknowledged* and carefully returned. It so often happens that notes, &c., arrive after publication, and, though of value, cannot be inserted without great extra cost. All I desire is to make the work as complete as possible, as no book exists on this special subject.

Trusting your readers will understand the spirit of my letter—I am, &c.,

PERCY G. STONE.  
16, Great Marlborough-street, W.

#### WATER SUPPLY AND SANITARY MATTERS.

**HOLMFIRTH.**—Last week Mr. Arnold Taylor held an inquiry at Hinchcliffe Mill, regarding the application of the Austonley local board to borrow the sum of £4,000 for the purposes of supplying their district with water. Mr. Joshua Barraclough, engineer, gave evidence to the effect that £4,000 would be sufficient to pay for the proposed undertaking. He also thought that there would be an ample supply of water at the proposed site, and was of the opinion that part of Holmfirth district could be supplied with the surplus water. Mr. Henry Roberts (chairman of the Austonley local board) opposed the application of the board, and advocated a joint scheme and amalgamation of the board's district with the district of Holmfirth as far more beneficial to the ratepayers. Mr. Henry Butterworth, chairman of the Holmfirth local board and a ratepayer in the Austonley district, also opposed the scheme. After hearing the evidence, the inspector visited the site of the proposed waterworks.

**SWINTON.**—Mr. Arnold Taylor, an inspector from the Local Government Board, opened an inquiry last week at the offices of the Swinton and Pendlebury local board into that board's application for sanction to borrow £8,129 for works of sewage and sewage disposal. The clerk (Mr. Hewitson) explained that the Swinton and Pendlebury local board, being threatened with litigation in respect of the pollution of Slack Brook and the river Irwell, had, with the advice and assistance of Mr. Vawser, C.E., adopted a scheme for the treatment of sewage, which the board proposed to carry out on land at the Carrs, Pendlebury, now belonging to Messrs. A. Knowles and Sons. Mr. Mountain and Mr. Vawser explained the nature of the proposed works, and the inspector, having heard further evidence for and against the scheme, afterwards visited the site in question.

The Wesleyans are erecting new Sunday-schools at Levenshulme. On Saturday afternoon nine foundation-stones were laid. The building will cost about £1,850. Mr. J. H. Maybury, of Booth-street, Manchester, is the architect; and Mr. Jonathan Swallow, of Levenshulme, the builder.

The Bradford Brick and Tile Company's report for the last half-year shows a profit on trade of £1,012 3s. 6d. The adverse balance of £388 18s. 9d. is extinguished, and £623 4s. 9d. remains as a credit balance. A division is announced of 2s. per share.

## Intercommunication.

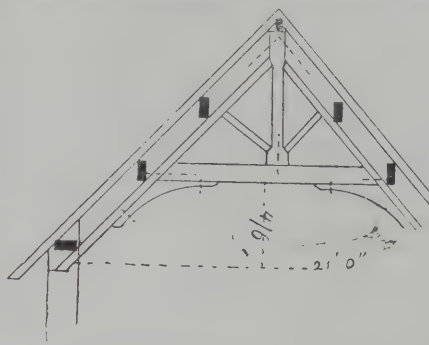
### QUESTIONS.

[9691].—**Statue to Giordano Bruno.**—I think I observed it stated some two years or so ago that a statue was erecting, or to be erected, in Rome to Giordano Bruno. I shall feel obliged for information if it has been erected, and for a description of it if so.—W. P. BUCHAN.

[9692].—**Californian Red Wood.**—In the Irish Exhibition is a piece of this wood, with other specimens, illustrating a case of wood specimens for school use. It is quite distinct from pitch-pine or Oregon pine, and looks like a piece of American pine (of the kind known in America as "white" but which we call "yellow" pine), stained with lake colour. It is marked "For internal use." Is this regularly in the London market, and in what forms and sizes, and at what prices? I remember reading of an American red wood (pine or fir) many years since, then said to be good for all purposes, timbering, joinery, external or internal, and even for piles for water work. Is this the same timber?—W. R.

[9693].—**Window and Door Heads.**—Would someone kindly explain by a sketch the right way to carry out the following instructions—"All door and window heads to be protected by 3lb. lead, extending from the outside of the wall to the inside of the cavity and there turned up."—PARSONAGE.

[9694].—**Load for Roof Principals.**—I wish to know the safe load of the roof principal and the method of calculating same, as I can come across no like example in any book on strains, &c. Principals, 9ft. apart;



roof, 45.0; bearing, 21ft.; timber, spruce. Ridge, 7 x 2; rafters, 4 x 2; purlins, 8 x 4; P. rafter, 7 x 4; tie beam, 11 x 4; K. post, 4 x 3; struts, 3 x 2; braces out of 14 x 3.—ENQUIRER.

### REPLIES.

[9685].—**Quality of Doors Fixed.**—Proprietor can require the joiner to hang doors of the size intended for the frames. The joiner has, I take it, agreed to carry out the work to the satisfaction of the employer. If the latter allows the doors to remain, he can certainly ask that an allowance be made.—A.

[9687].—**Strains.**—"W. J. P." is right. I am obliged for his correction, and ought to have noticed the error myself when looking over the proofs. If similar slips occur again, I trust they will also be pointed out.—G. A. T. MIDDLETON.

[9689].—**Shaky Floor.**—Take up two rows of floor boards, at equal distances apart, and stiffen the joists by herring-bone bracing. Another way would be to bolt on to two or more joists wrought-iron plates 1/2 in. thick. I should prefer the former method.—G. H. G.

[9690].—**Architects' Charges.**—If quantities were prepared with the knowledge of the employer, he is certainly liable for the surveyors' commission. "Fairation" can also charge his commission on the work executed and 2 1/2 per cent. on the painting and other work deferred.—G. H. G.

### PARLIAMENTARY NOTES.

**ASSISTANT CLERKSHIPS OF WORKS.**—Mr. Lawson on Monday asked the President of the Board of Trade whether it was possible so to modify the regulations of the Civil Service Commission as to examining for appointment to assistant clerkships of works as to admit skilled artisans to the competition who might show adequate knowledge of the practical requirements of the post, and why such conditions were enforced as specially to exclude them on account of their status. Mr. Plunket, who replied, said—Appointments to clerkships of the works (there are no assistant clerkships under my office) are open to all skilled artisans as well as to others who may succeed in the open competitive examinations held by the Civil Service Commissioners. But skill as an artisan in any one branch of labour would not be a sufficient qualification, and we require, as a condition from all candidates, that they should have had five years' practical experience in the general superintendence of building work.

Yet another Jubilee statue was unveiled at Bristol on Wednesday. It is the work of Mr. J. E. Boehm, R.A., and carved from one block of Carrara marble. The pedestal is Portland, and the curb and granite from the Penryn quarries.

### LEGAL INTELLIGENCE.

**CARPENTER — BUILDER — CONTRACTOR — ARCHITECT AT WESTON-SUPER-MARE.**—At Weston-super-Mare last week F. S. Durston, carpenter, of Clevedon-road, Weston-super-Mare, sought to recover £7 5s. 6d. for work done for William Lever, stationer, High-street, who had paid £2 and costs into court. Plaintiff said in the month of June, 1887, defendant informed him that he intended to make some alterations to his premises, and asked him to prepare plans and specifications. He told defendant that he would submit the work to public competition, and that his charge for plan and specifications would be £5 5s. Some time after this defendant informed him that he did not think that he would submit the work for public competition, and asked him to give a price for doing a certain amount of work, and also superintending certain other work in the course of construction. Defendant also asked him to help him to select the necessary timber, and to accompany him to Highbridge for the purpose. The day was named; but defendant informed him that he could not see his way clear to begin the job that year. In the month of February of this year defendant again sent for him and asked him whether he would do the work at the same price as arranged in the previous June. He said he could not, but that he would do the work for £30, exclusive of the different items mentioned last year. Plaintiff went to Highbridge in company with the defendant and made a selection of the timber, and he also superintended the work and used materials according to his specifications. Matters went on pleasantly until the 7th of June, when he asked for the payment of 50s. As defendant was paying him the money he said he wanted the front bay window finished. Plaintiff said that part of the work was not in his contract. Defendant then ordered him out of the shop, and requested him not to put his foot inside his premises any more. In about a month's time he presented defendant with his bill, when defendant again ordered him off his premises, and said he would put the bill in the fire. His Honour: How much money have you received on account? Plaintiff: £26 10s. I have not completed the sashes and frames. Cross-examined: In addition to being a carpenter, builder, and contractor, he was also an architect. He had prepared a plan and specifications, and also drawn up an agreement. He was sometimes paid 6d., 10d., and 1s. per hour for carpentry work. He agreed to work for Mr. Lever for 7d. per hour. He was also to receive one per cent. on the total cost of the outlay. He charged 15s. for his journey to Highbridge and 10s. for preparing quantities. He never told Mr. Stradling not to sign the agreement. The plaintiff then called his brother and a lad to prove that they had always been referred by defendant to the plaintiff as to the work they had to do. In defence Mr. Reed pointed out that plaintiff had appeared in court that day in the character of a carpenter, builder, contractor, and architect, and he should not be surprised to hear plaintiff say that he was a lawyer. In dealing seriously with the charges made by the plaintiff, Mr. Reed pointed out that plaintiff had admitted in his evidence that he had charged 10s. for preparing quantities, and 15s. for his journey to Highbridge as an architect, although his train expenses were paid by defendant. Plaintiff was simply employed by defendant to give orders as contractor. His Honour: It means that he superintended his own work. I consider the £2 paid into court ample, and I give judgment for defendant.

**AN IRISH JUDGE'S OPINION ABOUT ARCHITECTS.**—FLYNN V. DOLLARD.—The Irish Master of the Rolls gave judgment last week in this case for the defendant. We do not propose to recapitulate the evidence in the action, which was a light and air case, but note the fact that the Master obligingly stated that "A number of architects had made affidavits on behalf of the defendant. He (Master of the Rolls) did not consider an architect's evidence on a question of air more important than that of any ordinary intelligent person using his powers of observation."

**A CARPENTER'S CONTRACT.**—The plaintiff, Alfred James Pollard, carpenter and joiner, of Weston-super-Mare, sued the defendant, Richard Fear, a builder, of the same place, for £67 17s. 9d., for balance of contract, work, and extras carried out in completing three newly-erected houses in the Walliscote-road, Weston-super-Mare. Plaintiff's case was that he had entered into a contract to do the carpenter's and joiner's work of the buildings for £265, as per plans and specifications prepared by Messrs. Lingen-Barker and Cross, architects, Weston-super-Mare, and that by reason of certain deviations from the plans and specifications the contract had ceased to operate, and he therefore applied that the matter might be referred to arbitration. For the defence Mr. Masters referred to the clause contained in the contract that "all matters and things in dispute between the said parties relative to the above building shall



settled by the said architects, whose decision in such cases shall be binding upon and final to the said parties," and urged that unless it was intended to establish fraud on the part of the architects, the certificate given by them was final, and could not be reopened, and in support quoted the case of "Saphorne and another v. St. Aubyn." In Honour, in summing up, occurred in the new adopted for the defence, and a counterclaim which had been put in having been withdrawn, judgment was given for the defendant, with costs.

**SANITARY AUTHORITIES AND DRAINS.**—A case which affects the powers of sanitary authorities, and therefore the interests of the general body of ratepayers, was decided on Monday by the stipendiary magistrate sitting at West Bromwich. Section 23 of the Public Health Act, 1875, provides that where a house is without sufficient drainage the local authority may call upon the owner or occupier to make a covered drain or drains emptying into a public sewer where there is such a sewer within 100ft. from the house. Failing compliance with this notice, the authority may do the work itself, and charge the cost to the owner. Under this section the Corporation of West Bromwich sued Edward Phipps for the sum of £8 7s. 4d., the cost of making a drain from a house belonging to him in Fisher-street. Under the old commissioners, whose right and duties are now inherited by the corporation, the drainage from the property had been approved. The sewage ran in an open drain from the house into an open channel in the street, and from thence into a covered drain or sewer which emptied itself into the river Tame. In 1882, in consequence of complaints made by the Corporation of Birmingham that the sewage of West Bromwich polluted the river, a new system of sewerage was commenced. In pursuance of this scheme a new sewer was constructed within a reasonable distance from the house in question, the owner of which was served with a notice to lay drains to connect his property with it. The notices were not complied with, the corporation did the work, and proceeded against the defendant for the recovery of the cost. The stipendiary decided against the corporation on grounds which raise very important questions. There was a preliminary objection raised as to the form of the notice, on which the complainants were technically thrown; but although this might have closed the case the magistrate proceeded to give his judgment on the main issue which had been raised. He held that the open drains, which had once been approved by the commissioners, were sufficient for the effectual drainage of the premises, and that therefore the owner could not be called upon to alter them. Now, this decision opens two questions—one as to jurisdiction, and one as to the merits of the decision. As to the first point, it is to be noted that the clause itself does not define who is to be the judge of the efficiency of existing drains. It has been generally held that the sanitary authority is invested with this power, and this view is supported by Mr. Vesey Fitzgerald, whose annotated edition of the Local Government Act is regarded as of great value. That writer, speaking of this clause, says "the local authority are the sole judges of what constitutes a sufficient drain, including therein what materials are to be used in its construction." The opinion thus given is the one usually received, and it is scarcely possible that it can be allowed to be finally refuted by the decision of a stipendiary sitting in petty sessions. Apart from the legal point, the view taken by the magistrate is, of course, open to objection.

**COMPENSATION FOR CHEAPSIDE PROPERTY.**—**GUILDHALL, JULY 21.**—This was a case where the Commissioners of Sewers acquired a corner of Nos. 115 and 116, Cheapside, for the widening of Flook-street, the premises being occupied by Mr. Aggott, trading as "My Tailor," &c., and others, whose claims have been settled by the Commissioners. The claim of the freeholders, who are the trustees of the late Mr. Joseph Hadland, came before a special jury for assessment. For the claimant Mr. G. P. Bidder, Q.C., and Mr. H. A. D. Glyn, instructed by Mr. C. G. Woodroffe. For the Commissioners, Sir Edward Clark, Q.C., M.P., and Mr. Rose-Innes, instructed by Mr. A. E. Hayes. The surveyors retained on behalf of the claimants were Mr. E. Farmer, Mr. S. Walker, and Mr. Lang, and Mr. W. H. Woodroffe, A.R.I.B.A., who sent in the claim and negotiated the case for the claimants. For the Commissioners the witnesses retained were Mr. Robert Vigers, Mr. W. J. Adell, M.P., and Mr. Legge. After some discussion between the counsel on both sides, it was agreed that the sum of £22,500 and taxed costs should be awarded to the claimants. The area of the site is 1,300ft. The premises are subject to a lease at £800 per annum for an unexpired term of 14 years. The claim was based on an estimated ground rental value of 20s. per foot super, deferred 16½ years, on which basis the verdict was judicially given.

**THE WILL OF THE LATE MR. NESFIELD.**—**NESFIELD V. NESFIELD.**—(Probate, Divorce, and Admiralty Division.)—Before the Right Hon. the

President.)—Mary Annetta Nesfield, as executrix and widow of the late William Eden Nesfield, of 45, Buckingham-road, Brighton, propounded and sought probate of a will executed by him on August 3, 1887. Henry William Nesfield, brother of the deceased gentleman, opposed probate of the will set up by Mrs. Nesfield, and pleaded that at the date of the execution of this paper Mr. William Eden Nesfield was not of sound mind, and that consequently it was not a duly executed will. The defendant also, in turn, propounded a will which bore date August 18, 1886, and the plaintiff in reply pleaded that this will was revoked by the later testamentary paper of August 3, 1887. The late Mr. William Eden Nesfield was an architect of great ability, but of irregular habits. He died at Brighton on the 26th of March in the present year, leaving property to the amount of about £25,000. Under the will of August, 1886, the defendant was made his residuary legatee; but the will of the 3rd of August, 1887, made the plaintiff universal legatee and devisee and sole executrix. It had been expected that the hearing of the suit would occupy some considerable time, but when the case was called on on Monday last Sir Henry James stated that he was happy to inform his lordship that the only evidence which it would be necessary to adduce was that by which the plaintiff would formally prove due execution of the will propounded by her, in order that it might be pronounced for. Within the last few days the defendant had had an opportunity of looking through the documents in the case, and he had come to the conclusion that he ought to offer no further opposition to proof of the will of August 3, 1887. His lordship would have observed that in his plea the defendant made no charge of undue influence, but as matters about undue influence might have been rumoured in consequence of the will being opposed at all, he wished to say that there would be no foundation for an allegation that Mrs. Nesfield had exercised any such influence. Formal proof of due execution having been given, his lordship pronounced for the will of August 3, 1887, but made no order as to costs, it having been agreed upon that each side should pay its own costs.

**IS A "DUMB WELL" A DRAIN?**—**CROFT V. RICKMANSWORTH HIGHWAY BOARD.**—(Before Lords Justices Cotton, Fry, and Lopes.)—In this case, which came before the Court on Monday on appeal by the plaintiff in person from the decision of Mr. Justice Kekewich in February last, the question was whether a "dumb well" or shaft sunk into a porous stratum of chalk or gravel, into which surface-water from the highway was conducted by pipes, and from which it percolated away through the subsoil, was included in the term "drain," used in section 67 of the Highway Act, 1835 (5 and 6 Will. IV., c. 50), so as to authorise the Highway Board for the district to construct in the plaintiff's chalk-pit near to the highway a dumb well as part of their drainage system. The plaintiff was the owner of a house and grounds near Rickmansworth, at the foot of Scott's-hill, and above his house there was a chalk dell or pit, the property of the plaintiff, into which, at some period not clearly ascertained, the surface-water from the upper part of the hill had been conveyed by pipes which were laid into a brick receptacle called a dumb well, over which a wooden cover had been placed. In 1882 the Watford Board caused this dumb well to be cleaned out, and substituted new 9in. pipes for the old 6in. pipes. The plaintiff complained to the Board, and an arrangement was proposed by which the water and sewage which found a way into the pipes were to have been carried down to the river Chess, and the dumb well abandoned. This arrangement, however, from the provisions of the Rivers Pollution Act, 1876, could not be carried out. In January, 1884, the Watford District Highway Board was dissolved, and after some months' delay the Rickmansworth Highway Board was formed as its successor. The plaintiff had in the meantime stopped up the dumb well, and in this condition it remained until July, 1885, when the matter was taken up by the Rickmansworth Board, who had relaid the pipes and reopened the dumb well. In restraint of such proceedings the present litigation was instituted, and after a somewhat checkered career it had resulted in a decision by Mr. Justice Kekewich in February last adverse to the plaintiff's contention, which was, in effect, that the defendants, the Highway Board, were not entitled to interfere with the dumb well in his property under the statutory authority given to them by 5 and 6 Will. IV., c. 50, to make and keep open "all ditches, gutters, drains, or watercourses." From this decision the plaintiff had appealed in person. In the result their lordships, being of opinion that the "dumb well" on the side of Scott's-hill, into which water-pipes had been laid, was not "a drain" within the meaning of the Highway Act, 1835 (5 and 6 Will. IV., cap 50), section 67, so as to give defendants, the Rickmansworth Highway Board, the right to use it as part of their drainage system, reversed the decision of Mr. Justice Kekewich and allowed the appeal, giving the plaintiff

all the costs of the action and of the appeal in which he had succeeded, except the costs of an application to admit fresh evidence, which the plaintiff was directed to pay.

**ENGINEERS SHARING COMMISSIONS.**—**BURSTAL V. HAWKSLEY.**—(Queen's Bench Division. Before Lord Coleridge and a Special Jury.)—This was an action tried on Monday and Tuesday by a local engineer, who had been resident engineer for Oxford when the new filter waterworks were constructed, against Mr. Hawksley, engineer, who had been specially employed by the corporation as consulting engineer, to recover a share of the commission he had received on the work under an alleged agreement between him and the local engineer to share it in certain proportion. It appeared that in 1880 Mr. Hawksley, who had been consulting engineer to the city of Oxford for over 30 years, recommended Mr. Burstal as local or resident engineer, and he was employed as such at a salary. In 1880 the corporation resolved to establish filter waterworks for the city, and Mr. Burstal, who had been employed with Mr. Hawksley at Rochdale and two or three other places, drew some plans for the purpose (without, however, making any borings to ascertain the nature and capacity of the soil), and the corporation then consulted Mr. Hawksley, and in October, 1882, came to a resolution that the works should be carried out by him as the consulting engineer and by Mr. Burstal as the resident engineer. In consequence, it was said, of some mistake the word "jointly" was introduced into the minute of the resolution; but Mr. Hawksley pointed out that it conveyed a wrong idea, and the resolution really agreed to was that he should be employed as engineer-in-chief and Mr. Burstal as resident engineer. Mr. Hawksley, finding that Mr. Burstal had drawn some plans, desired to see them, but said that he must be solely responsible for the plans, and that they must be drawn in his office, and he made borings for the purpose of ascertaining the nature of the soil, and his plans were drawn with an important difference. The works were commenced and occupied some years, and were not completed until 1886. In 1887, Mr. Hawksley received his commission—about £700—and Mr. Burstal claimed two-fifths of that sum under an alleged agreement between him and Mr. Hawksley to share the commission in the proportion of two-fifths to three-fifths, which Mr. Hawksley entirely denied, and hence the present action to recover £284. After a long hearing, the jury at once found a verdict for the plaintiff for £284, the sum claimed, and judgment was given accordingly.

**THE BUILDING ACT: A SINGULAR QUESTION.**—At the Hammersmith Police-court on Monday, James Baker, a builder, was summoned by Mr. Ellis Marsland, M.S.A., district surveyor, in respect of a lift constructed in a block of buildings at Park-place, Knightsbridge. The question in dispute was whether a lift is legal in buildings which were let out in flats. The complainant contended that the Act prohibited any opening in a party arch, and that each flat should be separate, as the case with houses. He said in case of fire the flames would travel up the lift. Mr. Curtis Bennett referred to the large hotels in which there were lifts, and inquired whether they were according to the provisions of the Act. Mr. Marsland said those hotels did not come within the section. The majority of surveyors were in favour of his contention. On behalf of the defendant, it was stated that it was the universal practice to have lifts of that kind in mansions let out in flats. Mr. Marsland said the lift in the defendant's buildings went up through the centre of them. There was no objection to a lift in connection with the staircase. Mr. Curtis Bennett said he was against the complainant, and dismissed the summons.

**INCOME-TAX ON GAS PROFITS: CURIOUS POINT.**—There has just been decided by a judge in the Queen's Bench Division, in chambers, a case of considerable interest to the ratepayers of Newcastle-under-Lyme. Up to the present the Gas Management Committee of the Town Council have successfully maintained that the sum of £500 annually placed to the credit of the depreciation fund should be exempt from the payment of Income-tax. Mr. Clayton, of Stoke, surveyor of taxes, has disputed this, the sum sought to be recovered being only £15. The committee were supported in their contention by some dozen large Corporations, two of which cases have been fought out with success upon the precise point. In the case before the Court the Newcastle Corporation were not represented, it being considered, from statements made, that counsel would not be needed. In the Court the Attorney-General appeared on the one side, and judgment with costs went against the Newcastle Committee by default. The effect simply is that the committee will have to pay Income-tax on the £500, although no decision is given on the merits, which cannot again be raised, as the five years during which the depreciation fund was allowed to accumulate has elapsed.



## Our Office Table.

"BACK-TO-BACK" houses still exist in most large towns. Dr. F. W. Barry and Mr. P. G. Smith have made a report on the subject to the Local Government Board. It appears as the result of their investigations that the practice of building such houses is still in vogue in Yorkshire, and in some districts is on the increase. The result is the "huddling" together of houses and the crowding of the people upon a small area in a manner wholly inconsistent with health. Architecturally there is not much difference between the "through" houses and the "single" houses, except that in the latter the party walls are often less efficient. The cost is less, but not much less. On the other hand, the accommodation afforded in "through" houses is usually superior to that afforded in "back-to-back" houses of a similar extent. Whilst sanitary arrangements have generally improved, there has been little or no improvement in the ventilation of these "single" cottages. We shall notice the report, which is a useful one, at greater length next week, or as soon as space permits.

THE approaching meeting of the Institution of Mechanical Engineers is to be held in Dublin on the 31st inst. and two following days, and transferred to Belfast on Friday, August 3. On Tuesday next the first meeting will be held in the examination hall of Trinity College, when the president, Mr. Edward H. Carbutt, and the council will be received at 10 o'clock by Lord Rosse and the members of the local committee. The president will deliver an address, and papers will be read and discussed. At 1 o'clock the Reception Committee will entertain visitors to luncheon in the dining hall, and at 2 o'clock will give them a trip in Dublin Bay in a special steamer to view Alexandra Basin, the departure quays, the dredging apparatus, the Bailey Lighthouse, and Kingstown. At 7 p.m. the annual dinner will be given in the great hall at Royal University. On Wednesday the reading and discussion of papers will be resumed at 10 o'clock in the examination hall, and after luncheon, at 1 p.m., the visitors will be taken by special tramcars to the works of the Great Southern and Western Railway at Inchicore, or to the Rathmines Waterworks; and in the evening there will be a *conversazione* at the Loyal Irish Academy House in Dawson-street. On Thursday visits will be paid to Power's distillery and Guinness's brewery, and in the evening a special train leaving Amiens-street Terminus at 7 p.m. will carry the visitors to Belfast. Such as desire to see the Bessbrook and Newry electric tramway will proceed by the ordinary 2 o'clock train. On Friday at 9.30 there will be a reception to the president and council by the Mayor, Sir J. Haslett, and other members of the local committee. At 1 o'clock the visitors will be entertained at luncheon by the Mayor and local committee, after which they will have a trip round Belfast Lough, by invitation of the Belfast Steamship Company, to see the new dock-dredging operations and View Island Lighthouse, and at 8 p.m. there will be a *conversazione* in Queen's College, Belfast.

A METROPOLITAN improvement is just being effected which will make the approach to Charing Cross-road, running from Trafalgar-square to Oxford-street, more accessible and less dangerous. What with the railings of the National Gallery on the one side, and the steps of St. Martin's Church on the other, the thoroughfare was at this point restricted like the traditional neck of a bottle. For a long time the authorities of neither gallery nor church would yield an inch; but ultimately the former gave way, and what was a perilous corner has now been cut off, and the new piece to be added to the roadway will in a day or two be fit for use.

THE Council of the Society of Arts has received a grant from the Court of the Goldsmiths' Company of £50, to be awarded in prizes for the encouragement of workmen connected with the goldsmiths' and silversmiths' trades:—A cup or sugar basin of beaten silver, chased or otherwise, made within the year 1888. First prize, £20; second prize, £5. A pendant, or brooch, or locket of gold without gems. First prize, £20; second prize, £5. The articles for

competition must be sent in to the Society of Arts House on or before Tuesday, April 23rd, 1889. The conditions under which these prizes are offered are the same as those for the prizes for pottery, stone-carving, and wrought-iron work which have been previously announced.

THE arrangements for the approaching visit of the Royal Archaeological Institute of Great Britain and Ireland to Royal Leamington Spa are completed. The patrons of the meeting include the high sheriff of the county, the Archbishop of Canterbury, the Marquis of Northampton, the Right Hon. A. W. Peel (the Speaker), and others. Lord Leigh is president of the meeting. There will be three sections—the antiquarian, historical, and architectural. The opening meeting will take place on Tuesday, August 7, at the Town Hall, an excursion to Stratford will follow, and in the evening the antiquarian section will be opened. Wednesday will be devoted to excursions to Banbury and the opening of the historical section. On Thursday the annual meeting of the members will take place, and in the evening there will be a *conversazione* in the Town Hall. Friday will be devoted to excursions and sectional meetings; and on Saturday there will be an excursion to Coventry and a sitting of the sections. On Sunday there will be a special service at the parish church; and on Monday, Tuesday, and Wednesday, the 13th, 14th, and 15th, a succession of excursions to Hatton and neighbourhood, Leicester, Melton Mowbray, and Ratcliffe College.

AT a Special General Meeting of the Association of Public Sanitary Inspectors, called for the revision of rules, held at Connaught Mansions, Victoria-street, S.W., on Saturday, 21st inst., Mr. Hugh Alexander, chairman of council, presiding, it was unanimously resolved to add to the title of the association, the words, "of Great Britain." The president, Mr. Edwin Chadwick, C.B., who was unable to be present, addressed a communication to the chairman, approving the proposed enlargement of title. The full title of the association will be, in the future, "The Association of Public Sanitary Inspectors of Great Britain." Fifteen members and associates were elected, and Mr. E. Lewis Thomas, M.A., was unanimously elected "honorary counsel." It was announced that the association had received and accepted an invitation from the Mayor to hold a meeting at Brighton in August.

MR. A. H. KERSEY, A.R.I.B.A., is the architect for the new buildings to be erected at Westminster on the site of the Aquarium. The main front in Tothill-street will present a very imposing facade, at the Broad Sanctuary end of which a tower will rise, to emphasise the grand hotel which is to face Westminster Abbey. At the other end of the site, where the Aquarium theatre now stands, a series of flats is to be erected, and in the central portion of the buildings furnished residential chambers are to occupy the upper floors, the lower part being devoted to spacious offices. One leading feature in the hotel, besides ample dining-rooms and othersimilar apartments, will be a very large staircase, up which it is said the traditional coach-and-six could be driven with ease. A club for the use of the occupiers of the residential chambers is to be incorporated in new buildings, with a music gallery and other conveniences. Three large archways of somewhat ugly design lead to the inner courts, and the smaller entrances and lifts seem ample, and are conveniently placed. The design of the buildings may be described as a picturesque rendering of Continental Renaissance, with built-up gables and large windows, divided by mullions and transoms, grouped in bays which rise alternately into chateau-like dormers above the main cornice, which is 63ft. above the ground-floor level. The height of the ceiling of the top floor of the hotel from the same point is 110ft. The roofs are enlivened by a double range of dormers. Red brick will be used for the walling, with stone freely used for dressings. A balcony from the first-story rooms runs the entire length of the buildings, and in addition to this an open loggia is contrived at the same level to the hotel.

At a meeting of the City Commissioners of Sewers on Tuesday at the Guildhall, a long discussion took place on the old and often debated topic of the relative merits of the three

different kinds of asphalt pavements supplied by the several companies to the Commissioners. Mr. Judd introduced the subject on a motion requiring the engineer to make exhaustive experiments in order to test the relative qualities of each, so that the Commission may know which is best suited to the traffic of the City. Mr. G. Rose-Innes seconded the motion, contending that it was time to settle the question what was the character and the traffic for which each is best suited. Mr. Deputy Clerk moved the previous question. It would be wrong for them to destroy competition, and objected to spending the ratepayers' money that one particular company might get splendid advertisement. Besides that, who might be the best asphalt now might not be the best a year hence. The previous question was carried by a large majority.

PRINCE ALBERT VICTOR paid a visit to Bridlington Quay last week, and formally opened the Royal Marine Parade, Bridlington Quay, although a comparatively small town has spent no less than £120,000 in providing protection from the sea, and at the same time to enhance the attractions of the place by providing an extensive marine promenade, the ratepayers have now accepted an additional burden to the extent of £10,000. The new wall extends along the North Cliff 284 yards, and has been executed from plans prepared by the Local Board's surveyor (Mr. Dyer) by Messrs Whitaker Brothers, Horsforth. The concrete base extends to a depth of 7ft. 6in. below the bed of clay on which the cliffs stand. There is also a backing of concrete. The wall itself has been carried 20ft. above high-water level. Its thickness averages about 12ft. 6in. at the base and about 3ft. at the top. The escarpment is broken at intervals by immense buttresses, and there are flights of stone steps 10ft. in width. There is an asphalted footway along the top 14ft. wide and a carriage drive 23ft. wide.

THE employees of Messrs. John Howe and Co. of the well-known Cocklakes Alabaster Works, Carlisle, went to the Glasgow Exhibition last week for their outing this year, special carriages being provided, and a thoroughly enjoyable day was spent. We notice that the opening out of the new quarry in the east end of the Cocklakes bed of alabaster is approaching completion, and probably the finest head of alabaster ever seen in this country is now uncovered. The opening out of the above bed has practically taken five years, the work comprising a tunnel through the alabaster 41 yards long, along which it is proposed to run the locomotive, the stuff being hewn in galleries running into the same. In the old quarry this gives, together with the open space, a working face of nearly 600 yards, the bed being about 25ft. thick. The new quarry is to be worked open from east to west, the alabaster being continuous between the two quarries. Architects and others desirous of viewing the formation and obtaining information respecting this valuable material will be shown over upon application at any time.

### STATUES, MEMORIALS, &c.

THE FORSTER MEMORIAL.—The memorial tablet bearing a medallion portrait of the late Mr. W. E. Forster has been completed and is to be unveiled in Westminster Abbey by Lord Knutsford to-day at 4 o'clock. A 4ft. model of the statue has been approved by the committee, and can be seen by subscribers on presentation of their card at Mr. Pinker's studio, 22, Avonmore-road, Kensington. It is expected that the full-size statue will be ready for erection early in 1889. A site upon the Thames Embankment, opposite the London School Board offices, has been provided by the Metropolitan Board of Works.

The liquidation of the British Patent Glazing Company is complete, with the result that there is a balance of £127 14s. 10d., and the magnificent dividend of 4d. in the pound for the ordinary creditors. The liquidation expenses have been £398 17s., besides £100 paid to the lawyers.

Mr. John Hepper, chairman of the Leeds Central Parliamentary Division, laid a memorial-stone to a new Conservative Club at Stanningley on Saturday afternoon. The building is to be erected from designs prepared by Messrs. Kendall and Bakewell architects, Idle, at an estimated cost of £1,250.



**CHIPS.**  
At a largely-attended meeting of master umbers, journeymen, and medical men, held in verpool on Monday evening, under the auspices the Worshipful Company of Plumbers, resolutions were adopted affirming the desirability that umbers should be registered, and a local council is formed to promote the registration movement. Stoke-upon-Trent parish church, after being used for some weeks, during which period the terior has been renovated and repainted, was ened for Divine service on Sunday week. The rk of renovation has been carried out under a ntract by Messrs. Eardley and Son, of Newcastle.

**Holloway's Pills.**—Easy Digestion.—These admir- e Pills cannot be too highly appreciated for the wholesome ey they exert over all disorders of the stomach, liver, bowels, kidneys. They instantaneously relieve and steadily work out hrough cure, and in its course dispel headache, biliousness, ulence, and depression of spirits.

**Farside's Noted Bedfordshire Coarse and NE SILVER SAND.**—Is perfectly free from impurity, and the e and cheapest in the market. All qualities in stock, for every pose required in the building trade, for filtration, or for nursery poses. All pure grit.—Apply to **GEORGE GARSIDE**, Junr, ghton Buzzard.

**DOULTING FREESTONE.**  
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The most extensive Stock of every kind of Wood in Planks and Boards, dry and fit for immediate use.

**TENDERS.**  
\*.\* Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

**BANGOR, N. WALES.**—For pair of semi-detached villas, Bangor. **Mr. J. H. Phillips, M.S.A.,** Cardiff, architect:—  
Thomas, W. ... .. £2,450 0 0  
Pritchard, W. and O. ... .. 2,222 0 0  
Williams E. ... .. 2,157 0 0  
Williams, R. and J. ... .. 2,163 0 0  
Jones, E. ... .. 2,000 0 0  
Williams, E. ... .. 1,866 0 0  
Parry, L., Bodford, Llangeftni ... .. 1,659 0 0  
Accepted.

**BRISTOL.**—For new parish room, St. Mary Redcliffe, Bristol. **Mr. H. C. M. Hirst,** architect:—  
Beaven, A. J. ... .. £1,990 0 0  
(Accepted, but reduced on amended drawings to £1,850.)

**BROMLEY.**—For the erection of a residence, lodge, and stabling for Mr. A. Gurney Smith, at Bromley, Kent. **Mr. H. Percy Monckton, F.R.I.B.A.,** 32, Walbrook, E.C., architect. Quantities by Messrs. Drower and Rault, 17, Southampton-street, W.C.:—  
Higgs and Hill, London ... .. £3,990 0 0  
Payne, D., Bromley ... .. 3,895 0 0  
Turtle and Appleton, Wandsworth ... .. 3,800 0 0  
Holliday and Greenwood, Brixton ... .. 3,777 0 0  
Crossley, T., Bromley ... .. 3,751 0 0  
Maides and Harper, Croydon ... .. 3,688 0 0  
Smith, W. J., and Co., London ... .. 3,669 0 0  
Smith, J., and Sons, South Norwood ... .. 3,655 0 0  
Wiltshire, W., Sevenoaks ... .. 3,545 0 0  
Taylor and Sons, Bromley ... .. 3,540 0 0  
Roome, E. A., Clapton (accepted) ... .. 3,479 0 0

**BRISTOL.**—For the erection of Grand Stand and other buildings at Ashley Down, Bristol, for the Gloucestershire County Ground Co., Ltd. **Mr. F. W. Wills,** architect:—  
Bastow, J. ... .. £3,780 0 0  
Hatherly, E. ... .. 3,718 0 0  
Church ... .. 3,697 0 0  
Humphries ... .. 3,658 0 0  
Krauss ... .. 3,600 0 0  
Cowlin ... .. 3,498 0 0  
Rossiter ... .. 3,397 0 0  
Eastbrook ... .. 3,395 0 0  
Stephens and Bastow ... .. 3,389 15 6  
Forse ... .. 3,309 0 0  
Walters ... .. 3,278 0 0  
Brook ... .. 3,263 18 6  
Beaven, A. J. (accepted) ... .. 3,170 0 0  
All of Bristol.

**BRIXHAM, DEVON.**—For alterations and additions at the British Seamen's Orphan Home. **Mr. E. Appleton, F.R.I.B.A.,** architect. Quantities by **Mr. C. Sewell Appleton**:—  
Goss, W. A. ... .. £1,099 0 0  
Oldrieve, W. H., Dartmouth ... .. 1,098 0 0  
Pack Bros. ... .. 1,062 0 0  
Smerdon, J. ... .. 1,024 0 0  
Hazlewood Bros., Brixham ... .. 1,022 0 0  
McKellar, J. ... .. 999 0 0  
Yeo, R. ... .. 998 0 0  
Spark and Hayman, Brixham ... .. 954 0 0  
Matthews, F., Babbicombe ... .. 949 0 0  
Sanders and Son (accepted) ... .. 910 0 0  
Fike, E. ... .. 819 10 0  
Rest of Torquay.

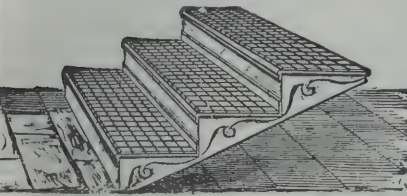
**CARDIFF.**—For additions, &c., to four houses in Eclipse-street, and three in Planet-street, Roath. **Mr. W. H. Dashwood Caple, Queen-street,** architect:—  
Hopkins, J., Roath (accepted).  
(Lowest of four tenders.)

**CARDIFF.**—For sanitary work, &c., including the laying of new drainage throughout, to two villas in Partridge-road, Roath. **Mr. W. H. Dashwood Caple, Queen-street,** architect:—  
Hopkins, J., Roath (accepted).

**DRIFFIELD.**—For the erection of five houses, for Mr. T. Holby. **Mr. J. F. Shepherdson, Driffield,** architect:—  
Mason, bricklayer, and slater:—  
Leason, W. ... .. £875 0 0  
Dry, C. W. ... .. 655 15 0  
Gage, M. (accepted) ... .. 640 0 0  
Joiner, plumber, &c.:—  
Rudd, T. ... .. 604 0 0  
Julian Bros. ... .. 548 15 0  
Naylor, H. (accepted) ... .. 464 0 0

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IN USE AT											
Ilway	Broadstone,	Ealing Terminus	Kenilworth	Monkwear-	Slough	Westminster	Dublin Castle	Schools, &c.	Stratford, Col-		
tations.	Dublin	Earl's Court	Kensal Green	mouth	Soho	Whitechurch	Police Barracks		grave Road		
ington	Burdett Road	Edgware Road	Kentish Town	Moorgate-street	South Bromley	Whitechapel	Eastney	Belfast Method-	Stratford, Sal-		
on Green	Burscough	Fallsworth	Kilburn	Monument	South Kensing-	Whitefield	Fleetwood	ist College	way Place		
ersgate street	Junction	Farringdon	Kilsby	Newcastle-	ton	Whitley	Fulwood	Battersea, St.	Sutton		
gate	Burton	Farrington	King's Cross	under-Lyme	Southport	Widnes	Hamilton, Glas-	Mary's Church	St. Jude's		
orp Park	Bury	Fenchurch	King William	New Cross	Speke	Willenhall	gow	Birmingham,	Tayport		
incham	Borough Road,	Street	Langley Green	Newport	Spring Grove	Willesden	Hulme	Cowper Street	Torrington		
an	Mersey Tunnel	Finchley Road	Latimer Road	Newton Heath	Stechford	Wood Green	Knightsbridge	Clapham	Upton Cross		
Street,	Canonbury	Firsby	Lea Bridge	North Brentford	Stepney	Wormwood	Leicester, Glen	Colchester	Wandsworth		
ockport	Camden Road	Forest Gate	Leamington	North Bridge	Stoke	Scrubbs	Parva	Forest Gate			
ingham,	Chalk Farm	Forest Road	Leman Street	Northampton	Stourbridge	Worsley	Manchester	Hanway Place			
ew Street	Charing Cross	Level Crossing	Leyland	(Castle Station)	Stratford	Wolverhampton	Newbridge	Harrow			
Bury	Cheddington	Fulham	Leyton	Nottingham	Stretford	Sunderland	Newcastle-on-	Haverstock Hill	Belfast County		
isbury	Cheetham Hill	Geddey	Lichfield	Oldbury	Sudbury	Sutton	Tyne	Orphan Work-	Lunatic Asy-		
asley	Junction	Gloucester Road	Limehouse	Old Ford	Sunderland	Sutton Coldfield	Normanton	ing School	Greenwich In-		
ay	Chequerbent	Gower Street	Lincoln	Oldham (Mumps)	Sutton	Temple	Northampton	Jamaica Level	firmary		
minster	Clayton	Grantham	Little Baling	Paddington	Thornton	Lyne	Norwich	Leyton, Gram-	Guy's Hospital		
ot Junction	Clitheroe	Greenwich	Liverpool Road,	Parsons Green	Thornley	Barnet	Portsea	mar School	Lincolnshire		
ingham	Crewe	Hackney	Liverpool Road,	Patricroft	Torquay	Belfast	Portsmouth	Leyton, Church	County Asylum		
opsgate	Crooked Billet	Haggerston	Manchester	Penzance	Tower of London	Budbrook	Preston	Road	Middlesex Coun-		
kfriars	Level Crossing	Hammersmith	Liverpool Street	Pickle Bridge	Tring	Burnley	Newhaven	New South	ty Lunatic		
idge	Cross Lane	Heaton Park	Llandudno	Pleak	Tynemouth	Catherham	Regent's Park	North Bow	Asylum		
Street, Sut-	Crumpsall	Hereford, Barr's	Long Buckby	Plymouth	Upton Park	Chatham	Salford	Old Ford	Nedley Hospital		
ldfield	Cullercoates	Court	Loudoun Road	Portsmouth	Victoria	Chester	Shorncliffe	Poplar, Byron &	Peterborough		
on-on-Tyne	Cannon Street	Highbury	Ludgate Hill	Prestwich	Walham Green	Coventry	Trim	Bright Streets	Infirmary		
hley	Dalston	Highdram Road,	Mark Lane	Raddcliffe	Walsall	Curragh Camp	Warley	Southsea,	Rubery Asylum,		
on	Daubhill	Wallsend	Maidstone	Road	Walsall	Dublin, Beggars	Winchester	Church Path	Northfield		
Bridge	Daybrook	Hollinwood	Manchester	Salisbury Road	Waterloo,	Bush	Woolwich	Southsea, Omega	St. Thomas's		
ay, India	Denholme	Holyhead	Manchester, Ex-	Seething Lane	Liverpool	Dublin, Island	Wrexham	Street	Hospital		
on Central	Droylesden	Homerton	change	Shadwell	Weaste	Bridge					
Lane	Drishlington	Horslow	Manchester	Sheffield	Werneth, Old-	Ship					
or	Dudley	Hounslow Bar-	Road	Shoreditch	ham	Dublin, Royal					
field	Dudley Port	racks	Mansion House	Sloane Square	Westbourne	Barracks					
1 Street	Dundee	Keighley	Mildmay Park	Snow Hill, Bir-	Park	Dundaik					
	Ealing Common	Kemble Junction	Milverton	mingham	West End Lane						



EPWORTH.—For the new Wesley Memorial Chapel at Epworth. Mr. C. Bell, F.R.I.B.A., architect. Quantities not supplied:—

Adam, Rotherham	£4,370	0	0
Perry, Sheffield	3,498	0	0
Baines, Newark	2,996	0	0
Thompson, Louth	2,900	0	0
Wright, Lincoln	2,870	0	0
Kelsey, Epworth	2,749	0	0
Holmes and Horton, Wainfleet	2,745	0	0

\* Accepted.—Ancester stone dressings and pitch-pine for roof and joinery being included.

FRIERN BARNET.—For making up Friern Park-road, Finchley Park-road, Woodland-road, The Avenue, Home-dale-road, Stanhope-road, and Carlisle-place, for the Local Board. Mr. G. Clarke, surveyor:—

Killingback, C.	£4,097	1	1
Kellett, A.	4,014	19	5
Bloomfield, J.	3,969	19	0
Trehearne, H. R.	3,912	0	0
Nowell and Robson	3,872	0	0
Bradshaw and Co.	3,811	4	7
Pizzey, J.	3,692	0	0
Nicholls, W.	3,628	2	0
Catley, A. T.	3,624	0	0
Bell, G.	3,563	10	0
Curnon, J.	3,550	10	0
Mowlem and Co.	3,500	0	0
Adams, T.	3,371	19	0

Tar-paving only:—

Smart, J.	£41	9	2
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GREENWICH.—For enlargement of Greenwich Union Infirmary, for the Guardians. Mr. T. Dinwiddy, Greenwich, and 24 and 26, Basinghall-street, E.C., architect. Quantities by Mr. W. F. Farthing:—

Lascelles and Co., Bunhill-row	£24,687	0	0
Knight, Sidcup	24,307	0	0
Wallis and Son, Maidstone	24,150	0	0
Mowlem and Co., Westminster	23,900	0	0
Downs, Walworth-road	23,630	0	0
Rider and Son, Borough	23,530	0	0
Schofield, Deptford	23,283	0	0
Martin, T., Maidenhead	23,000	0	0
Morter, J., Stratford	22,934	0	0
Deacon and Co., Lower Norwood	22,793	0	0
Bunning and Son, Camberwell	22,621	0	0
Stimpson, London	22,600	0	0
Kilby & Gayford, Worship-street	22,582	0	0
Parker	22,479	0	0
Jerrard, Lewisham	22,467	0	0
Kirk and Randall, Woolwich	22,230	0	0
Balaam Bros., Old Kent-road	22,222	0	0
Brass and Son, St. Luke's, E.C.	21,182	0	0
Holloway, New Cross-road	20,928	0	0

\* Proposed corrected total.

LONDON.—For additions to warehouses, for Messrs. List and Sons, Bunhill-row. Mr. C. Bell, F.R.I.B.A., architect:—

Allen and Sons	£975	0	0
Sharpe	910	0	0
Anley	890	0	0
Paine Bros. (accepted)	870	0	0

LLANDUDNO JUNCTION, N. WALES.—For six cottages, Glynymarl Estate, Llandudno Junction. Mr. J. H. Phillips, M.S.A., Cardiff, architect:—

Hughes, J. O.	£1,228	9	0
Jones, T.	1,148	0	0
Pritchard, H.	1,096	0	0
Evans, D.	1,050	0	0
Jones, B.	1,000	9	0
Pritchard, R.	970	0	0
Roberts, E.	960	0	0
Roberts, Evan	929	0	0
Jones H., and J.	881	12	0
Fowlkes, E., Colwyn Bay	808	0	0

\* Accepted.

PADDINGTON.—For painting and other work at the Infirmary, Harrow road, for the Guardians of Paddington. Messrs. A. and C. Harston, 15, Leadenhall-street, E.C., architects. Quantities not supplied:—

Dixon and Dowse	£510	7	6
Lesser, W. H.	380	0	0
Kirby and Chase	370	0	0
Pinn, F. G.	364	8	0
Maling, T.	345	10	0
Carder, P. H.	310	0	0
Foxley, G.	287	0	0
Stevenson and Co.	269	0	0
Handover, W. H., 307, Harrow-road, W. (accepted)	220	0	0

READING.—For making continuation of Elm Park-road (surface water and sewage drains, &c.) Mr. G. W. Webb, A.R.I.B.A., 14, Friar-street, Reading, architect:—

Reeves, W., Reading (accepted)	£150	0	0
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READING.—For block of forty-one cottages, Elm Park-road, for Mr. E. J. S. Jesse. Mr. G. W. Webb, A.R.I.B.A., 14, Friar-street, Reading, architect:—

Estates workmen	£5,330	0	0
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READING.—For alterations to the New Inn, Oxford-road, for Mr. H. B. Blandy, J.P. Mr. G. W. Webb, A.R.I.B.A., 14, Friar-street, Reading, architect:—

Strong Bros.	£431	0	0
Goodchild	419	5	0
Margetts	398	0	0
Bottrill and Son	377	0	0
Searle	359	0	0
Winkworth	357	9	6
Lewis and Son (accepted)	353	0	0

All of Reading.

READING.—For the erection of corner shop and residence in Rupert-street, for Mr. J. Sawyer. Quantities by Messrs. Rumble and Knight:—

Goodchild, W. (accepted).

READING.—Restoration of the Church of the Holy Trinity (first portion of work), reseating nave, &c. Mr. G. W. Webb, A.R.I.B.A., 14, Friar-street, Reading, architect:—

Wheeler Bros. (accepted)	£1,000	0	0
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READING.—For Temperance Refreshment House, Elm Park-road, for Mr. E. J. S. Jesse. Mr. G. W. Webb, A.R.I.B.A., 14, Friar-street, Reading, architect:—

Estates workmen (accepted)	£650	0	0
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ROSS.—For the erection of cottage at Graytree, Ross. Mr. A. H. Pearson, Ross, architect:—

Fellowes, S.	£169	0	0
Llewellyn, H.	127	10	0
Aldom, G. (accepted)	125	0	0

All of Ross.

ROSS.—For the erection of 20 workmen's cottages, for Mr. E. Turner. Mr. A. H. Pearson, Ross, architect:—

Kemp, J. B.	£1,920	0	0
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(Lowest tender received.)

ROSS.—For the erection of a pair of semi-detached cottages, for Mr. C. Jackson. Mr. A. H. Pearson, Ross, architect:—

Bennett and Linley	£530	0	0
Woolfe, J.	319	0	0
Aldom, G. (accepted)	289	10	0

SELHURST.—For the erection of a new school and parish room in connection with Holy Trinity Church, Canterbury. Messrs. Burke-Downing and Phillips, 26, Craven-street, Strand, W.C., architects. Quantities not supplied:—

Bryan, G. E., S. Norwood	£1,695	0	0
Smith and Bulled	1,497	0	0
Maides and Harper	1,497	0	0
Goulder and Glasscock	1,455	0	0
Taylor, H.	1,448	0	0
Smith, J., and Son, S. Norwood	1,437	0	0

Rest of Croydon.

SEVENOAKS.—For St. John's Hall and Schools, Sevenoaks. Mr. R. H. Hill, 3, Lombard-court, E.C., architect:—

Thurbon, E., Tunbridge Wells	£1,888	0	0
Jones, D. C., and Co., Gloucester	1,888	0	0
Grubb, W. A., Bromley	1,840	0	0
Bunning, J. W., and Son, Camberwell	1,759	0	0
Holloway, H. L., Deptford	1,699	0	0
Denne, G. H., and Son, Deal†	1,690	0	0

Shillitoe, J., and Son, Bury St.			
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Edmunds	1,680	0	0
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Abley, E., & Co., Shepherd's Bush	1,685	0	0
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Adams, H., Tunbridge Wells	1,660	0	0
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Lowe, R. A., Chislehurst	1,593	0	0
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Durtnell, R., Bra-ted	1,580	0	0
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Canty, W. H., Tunbridge Wells	1,573	0	0
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Kick, G. J., Beckenham	1,567	0	0
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Lay, G. H., Bromly	1,561	0	0
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Wiltshire, W., Sevenoaks	1,555	0	0
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Stephenson, G., Bishopsgate-street	1,545	0	0
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Avard, R., Maidstone	1,527	0	0
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Dabbs, W. M., Stamford Hill	1,527	0	0
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Jones, G. J., Tonbridge	1,500	0	0
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Hole, J., Sutton	1,478	0	0
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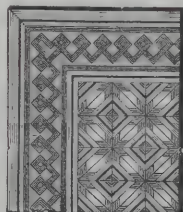
\* Accepted. † Too late.

WARWICK.—For supplying and fixing at Messrs. Lloyds, Barnetts, and Bosanquet's Bank, a new hot-water warming apparatus. Mr. J. A. Chatwin, F.R.I.B.A., Birmingham, architect:—

Hope, H., Birmingham (accepted)			
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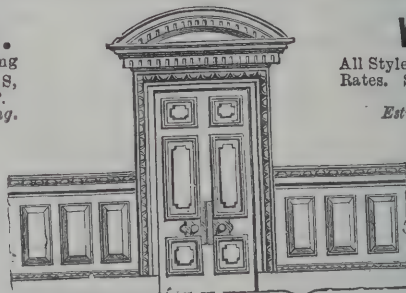
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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1752.

FRIDAY, AUGUST 3, 1888.

## NATIONAL COMPETITION OF SCHOOLS OF ART.

THIS year the prize works and drawings submitted by the various Schools of Art throughout the country are partly located in one of the galleries of the court formed by Sir F. Leighton's great fresco "Arts of Peace," the screens being placed on either side of the collection of images and Byzantine enamels. Another part of the exhibition is placed in the iron buildings adjoining the Architectural Courts. In such straits are the committee driven in housing these yearly works, that the permanent collection is encroached upon—a state of things that is necessitated by the dilapidated condition of the buildings of the Science and Art Department, which are literally neither wind nor watertight. The number of works sent up for examination was 78,730, from 237 Schools of Art and branch classes, a considerable reduction from the number of previous years, owing to the new regulation, which has materially cut short works in the simpler branches. Of this total number 2,473 in advanced stages have been selected, showing an advance upon the number of last year. Eight gold medals have been awarded to schools at Cork, Edinburgh, Glasgow, Ipswich, Leeds, Macclesfield, Manchester, and Stoke-on-Trent, five of which are for designs in stages 23c and 23b. Forty-two silver medals, 113 bronze medals, and 233 book prizes have been given in addition to the honorary awards made to training-students.

To begin with the Architectural work. A Leeds student, Charles B. Howdill, obtains the gold medal for a design for a post-office, the features of which are a public entrance on one side with high tower, a front public office, and a sorting office behind; the style a Renaissance version, in which stone is the material. A large-scale ink elevation is sent. John Frederick Wilkinson, Kendal, receives the silver medal for a design for a cathedral church, a design displaying infinite labour and mechanical skill and neatness, but lacking in artistic feeling and in good architectural proportion. Of course, the Per-florid Decorated style is selected; there the full complement of towers—two eastern and a central tower, all crowned by piers rivaling the glory of Lichfield, and a transept (which is not hung) in which the usual accessories of a cathedral church are brought together. The low proportions and the eagre flying buttresses, to say nothing of the tail, are defects in design. The draughtsmanship is perfect as a *tour de force* of mechanical accuracy. A silver medal is also won by Thomas Redfern, Manchester, for a design for the decoration of a restaurant, Pompeian in style and chaste in treatment, with a nice key of colour. A silver medal is awarded also to H. Baynton, a student of the Training Class, South Kensington, for a Municipal School of Art, Italian in design. The fenestration is bold, with sculptured pinnacles. A heavy curved roof with flat top soils the design, which is drawn and shaded in sepia. A very clever design for a mountain chapel, by Chas. R. McIntosh, Glasgow, takes a bronze medal. The plan is simple and well grouped. A low tile-roofed tower forms the vestry, attached to a vestibule and porch. A single-span tiled roof, hipped at end, covers the church; the walling is of a bluish-grey "rag," making a pleasing contrast with the red tiles, and the details are simple and effective. Frank Bailey, Nottingham, receives

a similar prize for a design for a museum and art gallery—a Gothic treatment with central tower, having a rather stumpy termination. A bronze medal is also bestowed on Arthur H. Hinds (Leicester) for a post office (one of the Institute drawings previously noticed by us), with some good Classical detail in it; also on W. H. Higginbottom's design for a church—a very ornate design, having domical towers with lanterns at east end, and two western towers and spires, somewhat German or Rhenish in type.

A bronze medal is given to W. H. Borland, Plymouth, for a design for a country residence, Elizabethan in style. There is some carefully-drawn detail; but the design is rather too broken up. We notice another good plan hung lower down, also a Gothic half-timbered and stone design by Edwin L. Lutyens, South Kensington. W. H. Midgley, Birmingham, has a bronze medal for a design for a modern church, illustrated by photographs from a sketch in clay; the plan is a Greek cross with dome, the details are coarse and heavy, and the windows mere slits. A book prize is given to A. C. Breden, Regent-street Polytechnic, for a design for a country house; and a half-timbered cottage in brick is also noticeable for good treatment, by Frank B. Cooper, Leicester. A Late Gothic design for a Village Institute takes the same prize, the author being Charles B. Howdill, of Leeds.

Other drawings include designs for iron-work, decoration, &c. The entrance gates by Stanley Baugham, Coalbrookdale (bronze medal), have boldly treated wrought and hammered panels; a design for the same object by Samuel Sillitoe, Manchester, intended for a church porch, is very effective in the panels (bronze medal); and measured drawings of iron gates by Thomas Reed, of Derby, take a book prize. The same award is bestowed on Michael Baugham, Coalbrookdale, for some good wrought-iron railings. A design for dining-room decoration by Arthur E. Pearson, Manchester, is somewhat heavy—there are painted panels and frieze; William H. Allen, a training student, sends an effective design for the decoration of a music room; Graham S. Nicholas, Scarborough, has a book prize for a suburban residence, Dutch, in red brick, ornamental gables and stone dressings rather spotty in appearance. We must also notice a pleasingly treated garden refreshment room with tile roofs, by Frank Lee, Sydney, N.S.W.; and a design for a church by W. S. Sweet, of the same place; also a clever design for an exedra joined to a billiard-room, by Arthur Jemmett, Westminster; all these receive book prizes.

The measured drawings are not so numerous as they have been. The Gold Medal is given to Percy Adams, of Ipswich, for his carefully delineated drawings and details of Dennington Church; we illustrated on May 18th Mr. Adams's drawing in this set of the screen. A silver medal is awarded to William James Anderson, of Glasgow, for drawings of church at Queen's Park, in that city, designed by A. and C. Thomson, in the Greco-Egyptian style; the drawings were reproduced by us on April 13th and 27th last. The details are well drawn. Larmont Penman, also of Glasgow, is awarded a bronze medal for drawings of St. Vincent U.P. Church, a Greek hexastyle Ionic, very neatly drawn; and William Allan takes the same prize for details of entrance to a church, showing some cleverly drawn incised Greek ornamentation. A less satisfactory Classic church is drawn by William T. Connor, Glasgow, which receives a book prize. Amongst other measured drawings we notice those of Cartmel Priory Church, by Walter S. Whitworth, Barrow-in-Furness, a fine Perpendicular edifice with low central tower, drawn in sepia; the porch of St. Edmund's, Southwold, of flint and stone—a

good example of flushwork, by Percy K. Allen, Nottingham, both receiving bronze medals; drawings of stalls in St. Mary's Church, Whalley, by John Rufus Lee, Burnley; sepia drawings of St. Kynaburga Church, Caistor, Northamptonshire, a fine Norman example of tower, by Hubert Walker, Peterborough; drawings of a chancel screen, Fitzwarren Church, Somerset, by Walter Fuge, Taunton, and the tower of St. James's in that town; a drawing of north-west tower, St. Paul's Cathedral, by Robert Bryden—all these taking book prizes. The modelled designs are creditable. A low relief design for a frieze is a graceful composition, worthy of the silver medal awarded, to Frederick Shelley, of Hanley; the modelled design for a bread-tray, by Ethel Atcherley, Manchester, is also refined, with low relief figures. We must also mention Ethel Gladys Huxley's design for the Slade School medallion as clever.

Gold medals are given to Caroline C. Beatson, for embroidery lace design; to Thomas J. Donohue, Macclesfield, for a clever wall-paper, with foliage, animals, and birds in sombre tones of colour.

The bronze-medal works are also promising. We particularly mention a design for a jardinière, by Arthur Boulton, Burslem, a design for a pedestal in terracotta, by Joseph Simpson, Hanley; designs for panels by President J. J. Brookes, Manchester Technical School. Maria T. Pearce, West Bromwich, wins a bronze medal for designs for panels for a pianoforte, the figures of dancing amorini all spirited. A modelled sketch of duck by C. W. McKechnie, Birmingham, is clever, and takes a silver medal. Silver medals also go to Emily Anderson, Cork, for lace borders; to Emily Batters, Hertford, for a tile design, in which brown star-like patterns with blue circles are introduced; to Samuel H. Moss, Macclesfield, for a tile pattern with intersecting circles and foliage in buff, red, and black; to Mildred M. Hall, Manchester, for a majolica plate, the motive being the spirits of Calm and Storm, a bold design, also some designs for terra-cotta. Ella and Gertrude Ginn, Hertford, receive bronze medals for designs for tiles and wall-paper; Edith Newton, Manchester, for a design for a monument of Liberty, details well drawn; Frederick E. G. Smith, Brighton, for a design for altar-frontal. Designs for hangings and wall-papers are not numerous. Constantine Procopides, Dora Robinson, and Fanny Royland, Manchester, send creditable designs for silk fabrics; Minnie Aumonier, West London, a mosaic design for floor-cloth.

We have no space to enumerate other designs. The chalk drawings from the antique comprise several works of merit. Hannah McGoun, Edinburgh, receives gold medal for "Silenus nursing the infant Bacchus." The monochrome oil-paintings from the antique include Oliver Silk's (Liverpool) disc thrower; John H. Parkyn's (Bristol) "Silenus with Bacchus," both awarded silver medals. Draperies arranged on the antique figures receive attention. Robt. Bryden, South Kensington, has a sleeping faun draped, drawn in chalk. Frederick Earles, of the Training College, and Laura Butcher, Wakefield, are other contributors. William Coe, Islington, shows several studies of drapery, and a chalk drawing of hand and foot, for which a book prize is given. The chalk drawings of hand, from life, by Charles T. Howard, Boston; the figure from the antique, by Catherine Stevens, Brighton; John W. Sothern's (Glasgow) drapery arranged on the antique figure; Ethel Buckingham's (Norwich) monochrome painting in oil from the east, and the work of another Norwich lady, Gertrude E. Offord, a monochrome oil study of ornament from the east, are noteworthy; they take silver medals. Of the nude figure



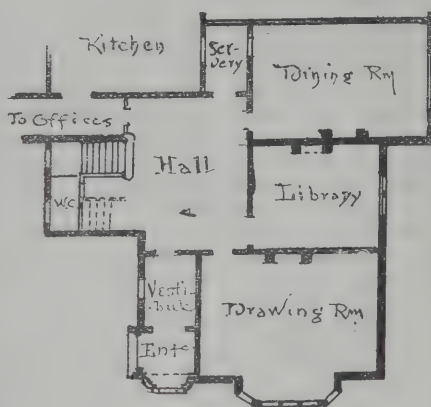
studies, Ernest Fabian, South Kensington, wins a gold medal for a clever model in plaster of a youth seated on the trunk of a tree, his head turned, and one hand on his hip.

Albert Baker, Stoke-on-Trent, takes a gold medal for water-colour studies of fruit, foliage, and flowers. The vine, with its clusters of black grapes, the sprays of white blossom, and other flowers, are rendered with charming truthfulness. Maud A. West wins a silver medal for a group of book flowers and drapery; the same prize is won by Robert E. Groves, Leicester, for a group of flowers in water-colours. Two groups in oil-colours of exceptional merit in composition and colour receive only book prizes. We allude to the groups by William Higgins and Ernest Jefferies, both of Birmingham. One, a group of oranges in a tazza, a branch of laurel leaves, and a relief background; the other, a broken pomegranate with lamp and evergreen, a stele representing the background. Maud A. West (Chiswick) and Agnes Bell (Clapham) send oil groups, the latter nice in colour, for which book prizes are awarded. Francis Reilly (South Kensington), student, receives a bronze medal for a nice group, comprising a silver tankard or cup, with grapes and relief background, admirable in its quiet key of colour; and Mabel E. Hobson a water-colour group of flowers and vase. We must also say Katherine L. Beard's group of mother-of-pearl plate and drapery is worthy of a higher prize.

#### HALLS AND STAIRCASES.—II.

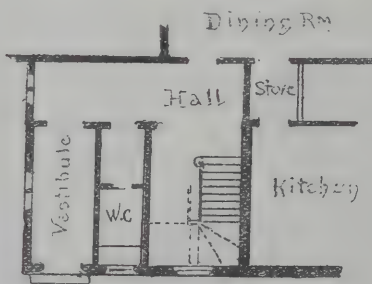
THE planning of a hall and staircase of small proportions requires often more skill and contrivance than a large one where the space is unrestricted. As we have pointed out, the ordinary designer makes his hall and stairs fit the space he can spare, instead of first arranging the plan of hall to suit an easy-graded staircase that shall be an ornament rather than a feature that must be got out of sight, and placed in any corner or recess. Some of the revivers of the Queen Anne could hardly have done more to traduce the interior character of that style than to put into respectable middle-class villas the worst form of newel and dog-legged staircase in which winders are largely introduced, with short flights of flyers. Some of the stairs we have had the curiosity to notice of this kind are so very abrupt and awkward as to be worthy only of a place in a labourer's tenement. It is quite impossible to turn a piece of furniture, like a piano or sofa, round a narrow, dog-legged staircase. Yet all at once the artistic merits of the newel and winders have found admirers. The massive newel of 6in. or 8in. square, boldly turned or carved, the handsome moulded and capped close-string, and the well turned balusters and ramped handrails were thought to be attractive features after the *pseudo*-Classic mania and the Nicholsonian staircase-making era had gone by. The joiner's ideal—the geometrical staircase, with its "wreathed" handrails, had long taken possession of the architect's mind, and rendered a change, when at last the more vernacular styles were revived, acceptable. The curvilinear or geometrical arrangements of stairs were speedily set aside for the rectangular. The clever joiner's model was the outgrowth of the contracted hall of the modern house; but it did not survive the change of taste in architecture. The stone staircases of the palatial residences designed in accordance with classical traditions were, of course, only to be found here and there, and in public buildings. So it was that the wooden types of staircases found in the old halls of the 16th century were eagerly taken. The winding staircase of Arden Hall, near Manchester, with its central newel post,

all of oak, put together with oak pins; or the one at Bramall, composed of solid blocks of oak, are examples; several others of the 16th and early 17th centuries, found in Cheshire, Derbyshire, and South Lancashire, present excellent models of woodwork staircases. The student has further the noble examples of Haddon Hall and the old English mansions, of which several are shown in Habershon's "Half-Timbered Houses," Nash's, and Richardson's

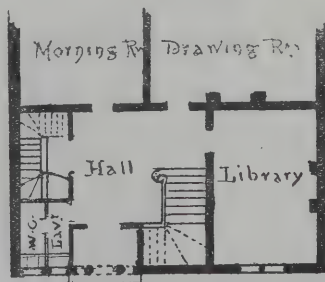


works. There was, moreover, in this type of staircase and hall something that was picturesque and truly national. The old halls awakened associations, "half legend, half historic," an air of comfort pervaded them, and the charm of poetry and romance was thrown over them.

We here consider the second division of our subjects, or halls at the side.

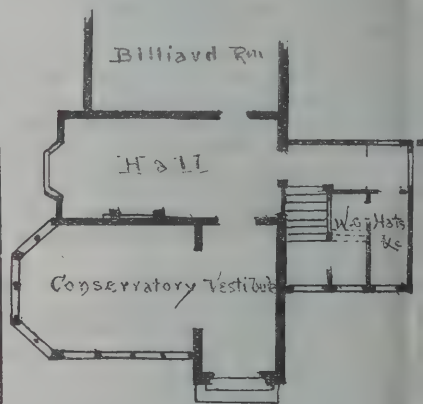


This is an arrangement that will suggest itself as the best for houses of several stories, or where top lighting cannot be so easily obtained. The hall, too, can be made an external feature, and the staircase pronounced as a tower or bay projection. Many of our detached suburban villas afford instances of the side hall and entrance, though too frequently these are cramped,



and the opportunities of making them effective and giving a good impression to the visitor are lost. The space allotted to the hall is one of the first considerations in planning—how large it can be without restricting the size of the rooms, rather than how small it can be made. Its primary use, that of giving access to the rooms from the stairs, is not the only one; a hall is a reception apartment into which the visitor first

enters, and by which he receives his first impression of the house. In connection with a small plant house or conservatory, the side hall might be rendered a very charming apartment. We shall show how this can be done as we proceed. Here we may properly mention one or two other more essential things in the planning of a small hall at the entrance. First, it is necessary that the doors at least should be passed before the visitor can be said to be in the body of the house, an arrangement necessary to prevent draught and insure internal warmth and comfort. In short, this is best insured by an outer hall or entrance vestibule and an inner hall, and no well-designed entrance should be without this double arrangement. In a private residence an outer hall, porch, or vestibule, whichever may be called, is better planned on two axes, not in a line with one another. Thus a vestibule may open laterally into the hall. The object of this arrangement is to avoid the intrusion of unwelcome visitors into an internal hall, which really becomes an inner apartment of the house. Second, it is a doubtful advantage in a domestic building to be able to see through in a straight line from the entrance door to the inner hall, though the modern builder appears to like this arrangement, favoured as it is also by many tenants of ostentatious predilections.



second plan with vestibule at right angles to the hall shows an arrangement that can be rendered attractive, especially if opposed to the front door, against the wall a few ornamental plants or jardiniere could be placed. In our last example is shown another better arrangement for a large house, the inner hall being closed off by a glass or painted screen with doors from the vestibule and the hall made an attractive and well-lighted ante-room to the billiard-room or drawing-room. The addition of a conservatory in this arrangement, opening into the vestibule, is a feature that well recommends itself to all who like to add the grace of plants, flowers, and statuary to the interior of the hall.

The staircase, as we have hinted, may become the central and prominent object of the hall, or be lateral to it, and hidden, partially screened off. Our first plan of the stairs made a central object in the hall. The passage to the offices on one side and the return flight on the other, give the centrality. Round the hall, which is well lighted by a window at the side, are placed the doorways of the dining-room, library, and drawing-room. The entrance doors to the side wall of vestibule, thus preventing direct view being obtained into the hall, a second glazed door being placed between the outer and inner hall doors, very different arrangement of the stairs is indicated in the second plan. Here they are screened from the inner hall by an arched doorway, a mode of dealing with the stairs which enables it to be kept as quite private if not subordinate in its treatment



character. The lateral stairway can generally be arranged in this way, and lends itself to many architectural treatments. The only requirement is that it should be well lighted. Windows at the back or staircase wall. The openings can be filled with grisaille or painted glass subjects, or hung with curtains. We are speaking now of halls of some size in private residences of a superior class; the treatment would be out of place in ordinary houses, and look more pretentious than justified. One important arrangement of a hall with staircase is that indicated in our last plan, in which the first flight is made to ascend towards the entrance front. An obvious advantage to this mode is that visitors or strangers cannot see anyone going up stairs, the first flight is rendered private, while it is convenient to the doorways of the main reception rooms. The servants' stairs is so compactly brought into communication, and both can be well lighted through the clerestory walls. The plan suggests itself as one suitable for town houses.

### THE METROPOLITAN BOARD OF WORKS INQUIRY.

THE Royal Commission resumed their sittings on Friday, when the first witness called was Mr. James Beal, who said that Mr. Furniss, contractor for a section of the Thames Embankment, was allowed to fill up the reclaimed land with rubbish which he obtained from builders and others, instead of material taken from the bed of the river. He was sure that Sir J. Bazalgette's evidence could not be sustained in this respect. Macadam material laid afterwards to be used in consequence of the sinking of the stuff that was put in, and this involved an expense of thousands of pounds to the ratepayers. Mr. Ridley's tender was the lowest, and he was ready to deposit £30,000; but the contract was let to Mr. Furniss, for whom three members of Parliament at the time became sureties. Those members were Mr. Doulton, Mr. Jackson, and Mr. Staniland, one of whom, the witness said, received £5,000 for becoming guarantee. Lord Herschell: Apart from the question of Mr. Ridley's being the lowest tender and the other higher, it did not matter to the Board whether it was made by deposit or sureties?—Witness: I think it did. Have you anything to show that the Board knew of the arrangement when you say it was corrupt?—If you have a list of contractors and the names of the sureties; if you have contracts for millions given to one man, the engineer of the Board the sole arbitrator as to extras, and the amount of extras let out, you have your lesson. You will see the whole thing. Lord Herschell: There is a deal beyond that if you want to see the whole thing. Continuing his statement, the witness thought that the balance kept at the bank was too large, the Board borrowing money from the public at 3 per cent, and receiving only 1½ per cent. from the bank. The chairman of the Board, he thought, should sign all cheques; but Lord Magheramorne could not do so, having come into an estate which required him to live in Ireland three months in the year. Lord Herschell remarked that the witness referred to by the witness could surely be discharged by the chairman of the Finance Committee.

Mr. William Webster stated that he was the father of the late Mr. William Webster, contractor. He did not personally know of the other contracts carried out by his father for the Board of Works. Witness commenced his evidence in March last. His father's firm had taken any contracts since 1832-33, but his father's business was carried on until December, 1886, when the partner was Mr. Staniland, formerly of Boston. The books of the firm were destroyed when the partnership was ended. Mr. Bosanquet: You have a contract with the Board yourself?—Yes for the precipitating tanks and reservoirs at Crossness. Was that advertised for public tender?—Yes. Had you anything to do there before your tender was accepted?—I had commenced in January some experiments at my own expense in reference to an electrical invention for treating sewage. Was your tender accepted?—In May.

Mr. Mark Judge said he was foreman of the coroner's jury who made an inquiry into the fire at Mr. Whiteley's in 1887. Much surprise was expressed by the jury at the extraordinary rapidity with which the fire spread throughout the several buildings. Lord Herschell: The jury on that occasion made certain recommendations relating to inquiries respecting fires, and to the serious danger which might result from unscientific construction?—Yes. On that occasion Mr. Saunders, who was architect of the buildings, gave evidence?—Yes. And also Mr. Gundry, the district surveyor?—Yes.

Mr. Alderman Saunders, recalled at his own request, emphatically denied that he put any pressure whatever on Mr. Villiers with a view to being employed as architect of the Pavilion Music Hall. Mr. Villiers went to him as an ordinary client, and he received him as such as a man of honour. He repudiated a suggestion that his professional ability was not such as to justify his appointment as architect to the Pavilion. During a career of 30 years buildings had been erected by him in all parts of London which disproved the imputation. Where the evidence of Mr. Villiers was in conflict with that which witness had given at an early stage of these proceedings, he saw no reason to alter the statements which he had already made. Lord Herschell: According to you, Mr. Woodward first came to you and simply introduced Mr. Villiers to ask for your support, and nothing was said about your being architect?—That was my impression, and it is so still. Did you speak to Mr. Woodward about Messrs. Isaacs and Florence posing as architects for the Pavilion?—No. Mr. Woodward is in error. Sundry architects were pressing Mr. Villiers for the position of architect. I have been many years in the profession, and I believe I have never done a dishonourable act. Lord Herschell: Just attend to the questions, and do not make general observations. Witness: Yes, your lordship, but an imputation was implied. Before Mr. Villiers had come, had Mr. Woodward asked you about acting as architect for Mr. Villiers?—I think there Mr. Woodward was in error as well. My belief is that a question was asked me either by Mr. Villiers or Mr. Woodward whether there was any objection or difficulty in my acting as architect. I stated that there was no objection in my acting if he wished me to do so, and that I should feel it an honour, being a good building. But I said, as a member of the Board, if I did act, I could not vote or take part in anything to do with himself or his property. When you said that you could not vote for him, did you add that there are more ways of killing a cat than hanging it?—No; I should say that is more likely to have been said by Mr. Villiers than myself. Did you say, "Do I understand I am to be your architect?"—Not on that occasion. That was six weeks or two months later. As time was pressing I wanted to know who was to act—whether Mr. Worley or myself. The witness, in further examination, said he wanted it to be clear that he knew nothing of any relation between Mr. Villiers, Mr. Goddard, and Mr. Robertson. He had no recollection of any conversation with Mr. Robertson about the Pavilion site. Asked as to his connection with the Criterion Theatre, witness said he advised on the plans and as to the new entrances. He was a member of the Theatres Sub-Committee which had to deal with these questions. It did not strike him as improper to accept a retainer in such a case. Were you not present when this matter came before the committee?—Apparently on one occasion I was. You moved a resolution on one occasion?—Yes. There was no record on the minutes that you were professionally engaged?—There was not. Will you swear that you told the committee you were professionally engaged?—Not in that particular instance, but I could in others. With respect to the Cook Tavern, in regard to which witness was engaged as joint architect with Mr. Verity, he said that he was first employed in that case, and plans were prepared in his office. He served notices on neighbouring owners and negotiated with them. For these services he received £450. The buildings were not completed, the site being afterwards sold by Messrs. Spiers and Pond. With regard to Mr. Bird's evidence, he prepared plans and tracings for the Albany-road estate at Walworth, and advised as to

frontages. No question was ever raised as to payment of his fees for this until four years afterwards. He had then erected other buildings for Mr. Bird, and charged in his account 50 guineas in connection with the Albany-road estate. Mr. Bird's previous plans had been rejected when you were engaged?—Some had. You were advising on fresh plans that would go before the Board?—Yes. Before the Building Committee?—Yes. And you were a member of that committee?—I was. Did not that seem to you a questionable proceeding?—No. You must remember that unless a professional man is to go out of his profession he must have a few cases out of hundreds which come before the Board. That may be all very well, but if there are only a few cases out of hundreds, a man need not go out of his profession in order to avoid dealing with matters that come before the Board?—I could not say that I would not touch the work. If you could not refuse any professional work in consequence of your position on the Board, you could resign that position?—Of course I could. Mr. Studd called the witness's attention to a resolution which he had proposed as deputy chairman of the Building Act Committee, and Mr. Saunders remarked that the recommendations of committees were often moved *en bloc*, and at that time he did not know that this particular resolution was included in the committee's report. Respecting the evidence of Mr. Francis, the witness said that he gave great attention to the supervision of the erection of the Grand Hotel, and some of the plans were executed in his office. He did not know before the site was obtained that he was to be joint architect. It was a mistake to think that he could bias the Metropolitan Board of Works. The members were a great deal too sharp to allow any one member to influence them. By Mr. Bosanquet: When he said that he would give proper consideration to Mr. Villiers's application for the Pavilion site, he knew that, as an old tenant of the Board, having paid a high rent for years, he was deserving of the first consideration. Asked if Mr. Woodward, who was a former assistant in his office, had shared with witness fees which he had received in compensation cases, Mr. Saunders said he believed that Mr. Woodward received the whole. Very often a principal assistant was allowed to practise for himself. He thought Mr. Woodward was mistaken in his evidence in this respect. By Mr. Studd: Witness advised Mr. Gordon what to tender for the Grand Hotel and Hôtel Métropole sites. Do you think that was a right thing to do?—Yes. I was exceedingly proud to be able to get such good tenants, the previous tenders having fallen through, and I knew they would carry out their contracts. My impression is that I ought to be thanked. Lord Herschell: Are there any other transactions that we do not know of in which you advised and which came before the Board? Witness: Not that I know of.

At Tuesday's inquiry Mr. H. Harber, a member of the Metropolitan Board, said he thought Mr. Vulliamy, the late architect, in the latter years of his service at the Board lost entire control over his subordinates; in fact, that his subordinates ruled him. Witness pointed out to Mr. Fowler, then deputy-chairman, the scandal which might arise unless there was greater control over the architect's department. He spoke to Mr. Vulliamy with a view to his resigning, in order that they might entirely clear out Mr. Robertson and Mr. Goddard, as he had secondary evidence which convinced him that they were not honest.

Mr. Verity, architect, recalled, said that the evidence given on Friday by Mr. Saunders was inaccurate. It was absolutely true that in connection with the Cook Tavern site Mr. Saunders did practically no work at all. He neither negotiated for the site nor made a plan of it. The only work Mr. Saunders ever did, so far as witness knew, was to fill up the Building Act notices from the information which he gave to him. It was not the fact that Mr. Saunders was appointed architect first. Witness never had a single interview with him as to the Criterion, but paid him for his clients a cheque for £450 for services in connection with that building, although ostensibly it was given for the Cook Tavern.

Mr. Haines Rowell said that he had the supervision of the works carried out by the late Mr.



Webster, contractor. They were executed according to contract, unless there was some reason on some occasions why they should deviate. He knew of no cases in which the work was diminished without deduction being made.

Mr. John Crowe, for 30 years manager of the indoor department for the late Mr. Webster, said Mr. Webster made loans to members of the board, including Mr. Frederick Doulton, Mr. William Newton, and Mr. Fowler. He ought not to call Mr. Fowler's loan probably. There was a debt standing from the Opera-house. Some question arose about a new design for the National Opera-house. Mr. Webster undertook to pay for it, and if the new design were a success he was to pay £500, and if it was not a success £250. He paid £500, and afterwards told Mr. Fowler that there was £250 due from him.

Sir J. Bazalgette, recalled, stated that not rubbish, but good solid clay, was deposited as filling-in of the Embankment. Are you aware that people paid the contractor for being allowed to deposit rubbish there?—I believe there were a few cartloads paid for. Others came from a distance, when the contractor paid for them. That was a matter I had nothing to do with. Sometimes considerable sums are paid for permission to deposit rubbish?—It depends on the distance that it has to be carried. It is a matter as to which I, as engineer, should not interfere in the least. The statement that there were settlements in the Embankment which had to be filled up with macadam at great cost to the ratepayers, had no foundation in fact.

Several members of the Building Act Committee stated that they had no knowledge that Mr. Saunders and Mr. Fowler acted professionally in relation to the Albany-road estate and the Criterion Theatre.

Mr. Furniss, a member of the Board, was questioned by Mr. Winch as to his receiving two tickets for Drury-lane Theatre from Mr. John Hebb. He denied that he had asked Mr. Hebb to write for the tickets. The tickets were used by members of his family.

The Commissioners adjourned to Tuesday next.

#### PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—IV.

By HENRY LOVEGROVE, F.S.I., Surveyor.

##### TILER.

38. **TILING.**—Cover the roofs with well-burnt, plain Broseley tiles of a strawberry tint laid to a 3in. gauge with double eaves course on 1½in. by ½in. sawn laths. The valleys to be laid with proper valley tiles set and pointed in cement, and the hips to be formed with proper hip tiles.

39. **Ridges.**—The ridges to be finished with plain red ridge tiles bedded and pointed with cement. Leave all roofs clean and perfect at the completion of the works.

**Notes.**—Measure the tiling and bill in squares of 100ft. superficial; describe the gauge, the laths, the pins, whether of oak or iron. Deduct chimneys and skylights. Allow for cutting to hips and to valleys. Run the valley and hip tiles, and extra for bedding tiles in cement to eaves by the foot run. Ridge tiles by the foot run, stating how bedded.

##### TILER.

ft. in.		
35 9	Plain red tile ridge roll bedded in cement.	
13 0		
14 0		
10 6		
73 3		
2	Terminations of do. and junction with two hips.	
1	Intersection of ridge with two valleys.	
3	Do. with one hip and valley.	
2 18 9		
25 6	956 3 Tiling with tiles as described on and including battening ½in. deal boarding and inodorous felt (allow for lap.).	
35 9		
20 0	715 0	
35 9		
24 6	876 0	
4 6		
4 6	20 3	
	2567 6	
2 31 0	62 0 Cutting and waste to tile valley, both edges measured, and do. to ½in. boarding.	
2 25 3	50 6	
2 2 16 9	67 0	
	179 6	
2 2 32 3	129 0 Add hips.	
2 8 3	16 6 Deduct.	
	112 6	
2 2 2 3	9 0 Add do	

ft. in.	ft. in.	
2 8 3	16 6	Add valley to former.
2 6 9	13 6	Cutting and waste tiling abutting wall over porch.
2 13 0	26 0	Add to gable over porch.
2 1 11		
5 0	19 2	Ddt. tiling, battening, &c., for chimneys.
9 0		
3 3	29 3	
9 0		
6 3	56 3	Do. for dormer at back of chimney.
	104 8	
2 2 5 0	20 0	Cutting and waste tiling abutting wall.
2 1 11	3 10	
2 3 3	6 6	
	50 4	
2 6 3	12 6	Do. to sides of dormer at back of chimney.
2 2 21 6	86 0	Do abutting against wall gables.
2 5 0	10 0	Double tile course in cement to eaves to dormer over porch.
20 6		
72 3	92 9	
2 6 3	12 6	Cutting and waste to tiling next chimney.
9 0		
4 9		
3 3	15 5	Ddt. tiling, battening, &c., for chimney.
26 0		Cutting and waste tiling abutting against wall.
2 35 0	71 6	Cutting and waste tiling next ridge, C.E. measured.
2 13 0	26 0	
2 14 0	28 0	
2 10 6	21 0	
	146 8	
7 1 3 6		
10 0	122 6	Tiling, lathing, &c., to roof of bay.
12 10 6	126 0	Cutting and waste tiling at hips.
2 10 0	20 0	Do abutting wall.
5 3 6	17 6	Double course of tiles in cement at eaves.
2 2 6	5 0	
31 0		
25 3	56 3	Valley tiles and fixing.
2 16 9	33 6	
	89 9	
2 32 3	64 6	Hip tiles.
8 3		Ddt. do.
	56 3	
2 2 3	4 6	Add do.
8 3		Valley tiles as before.
6 10 6	63 0	Hip tiles to bay.
2 6 0	12 0	Cement pointing and fillet to verge to dormer.

##### TILER.

Tiling with tiles as described on and including battening.

	D dt.
2567.6	
122.6	104.8
2690.0	15.5
120.1	120.1
2569.1	

Run. Plain red tile ridge, well bedded in cement.

73.3 Terminations of do. and junction with two hips.

2 Intersection of ridge with two valleys.

1 Do. of one hip and valley.

		Valley tiles.
		89.9
		8.3
		98.0
Rim. Cutting and waste to valleys, both edges measured.	Do. to hips.	Do. against walls.
179.6	112.6	39.5
16.6	9.0	30.4
196.0	126.0	98.6
	247.6	9.0
		26.0
		20.0
		223.4

	Hip tiles.
	55.3
	4.6
	63.0
	123.9

Cement pointing and fillet to verges.

12.0 Double course of tiles at eaves in cement and pointing.

ft. in.	ft. in.	
115.3		
22.6		
137.9		
Squares.	ft. in.	£ s. d.
25	70	Supl. Best Broseley tiles of strawberry tint tiling laid to a 3in. gauge, and securely fixed with oak pegs to heart of fir battening, 1½ by ½, for which include .....
	223	Run. Cutting and waste where tiles abut against walls .....
	117	Do at ridge, both sides measured .....
	248	Do. at hips do. ....
	196	Do. at valleys do. ....
	12	Cement pointing and fillet to verge .....
	138	Extra for double course of tiles at eaves in cement, and pointing with do. ....
	73	Plain red tile ridge bedded and pointed with cement .....
	98	Run. Valley tiles and bedding and pointing with cement .....
	124	Run. Hip tiles, do. do. ....
		No. 2.—Terminations to ridge and intersection with two hips .....

No. 3.—Intersection of ridge & s. with valleys .....

No. 1.—Do. of ridge with two valleys .....

Leave all roofs clean and perfect on completion of works...

Carried to summary ...

##### MASON.

40. **Stone.**—All stone to be of good quality, free from shakes and discoloured veins, and to be laid upon its natural quarry bed.
41. **Casing Up.**—All work exposed to injury to be properly cased up and cleaned down at completion.
42. **Hearths.**—The hearths of kitchen and scullery to be 2in. rubbed York stone. All other hearths to be of tiles, at an average cost of 12s. per yard superficial, p.c., bedded and jointed in cement.
43. **Steps to Front Entrance.**—The top step to be 14in. by 7in. rubbed York; the other steps to be 12in. by 7in. rubbed York, backs tooled chamfered; the landings to be 6in. rubbed; the step next the road to be 12in. by 7in., and the paving to be rubbed York, bedded and jointed in mortar, and laid on concrete over a brick arch. The steps down to trade entrance to be similar.
44. **Steps to Garden Entrance.**—The top step to be 12in. by 6in., the remainder 12in. by 7in.; the landing to be 2in. rubbed York, bedded and jointed in mortar.
45. **Cover Stone.**—The cover stone to be 14in. by 4in., as shown, to be 14in. by 4in., as shown, to widths.
46. **Thresholds.**—The doors to conservatory, as shown, to have 3in. rubbed York thresholds. All top steps and thresholds to be back jointed and morticed for frames.

##### RED CORSEHILL STONE.

47. **Dressings.**—The bands and arches, heads, dressings, jambs, and sills of windows, columns and cornices of porch and dressings generally, to be of red Corsehill stone of the best quality, and laid on its natural quarry bed.
48. **Workmanship.**—All to be worked in accordance with the detail drawings, and put together with all necessary joggles, cramps, dowels, &c.
49. **Carving.**—The carving to be executed by a carver approved by the architect, and the whole of the work must be carefully cleaned down at completion.
- CHIMNEY PIECES AND HEARTHES.**
50. **Chimney Pieces.**—The dining and drawing rooms to have chimney pieces £15 each p.c. The breakfast room and four other bedrooms to have chimney pieces £10 each p.c., and all other rooms to average £4 each p.c. All the above prices exclusive of fixing.
51. **Tile Hearths.**—The tile hearths in dining room, drawing room, and library to be of the average value of 12s. per yard, and to be carefully laid on a 3in. cement bed and jointed in cement.
52. **Fenders.**—Provide and fix No. 11 marble fenders to cost on the average £10 each p.c., exclusive of fixing.

##### EXTRACTS FROM THE DIMENSIONS.

##### FRONT ENTRANCE DOOR.

ft. in.	
2 2 3	Red Corsehill path stone as before in bed.
9	
7 2 0	moulding.
2 1 11	
9	
6 1 5	Add.
1 2	
9	
6 5	Add.
	3 10
2 2 10	
9 4 3	
2 2 5	
9 3 8	Bed and joint.
1 8	
9 1 3	
	9 2
8 8	
9 6 6	Circular sunk joint.
9 8	
9 7 3	Add.
8 9	
1 0 8 9	Circular moulding.
2 2 3	
1 2	
1 3 6 7	Stone as last in arch.



ft. in.					
2 1 9					
1 2					
1 2 4 9	Do.				
1 0					
1 2					
1 2 1 4	Do.				
12 8					
8 8					
1 2 10 1	Circular sunk joint.				
5 3					
1 2 2	Circular sunk face.				
2	Circular rebate 7in. girt for frame.				
5 3					
1 6 7 3	Semi-centre to stone arch.				
5 3	Circular moulding 9in. girt.				
7 11					
5 3 4	Plain face, narrow.				
1 0					
1 2 11 8	Sunk joint.				
2 2 3					
1 3 5 8					
1 9					
1 2 4 1	Half sawing at back.				
1 0					
1 2 1 2					
10 11					
2 1 6					
1 0					
5 1 3	Stone as last in caps.				
2 1 11					
1 0 3 10	Bed and joint.				
2 6					
5	Rough sunk face.				
2 1 3 4	Moulding 11in. girt in short lengths to caps.				
2 3 6	External mitres.				
2 1 2	Stopped ends.				
2 5					
6 5	Plain face at back next frame.				
2 11 110	Fair cutting in red brick facing to fit to stone moulding.				
1 1					
1 2					
8 1 8	Stone as last in reveal under cap.				
1 9					
1 2 4 1	Bed and joint.				
2 8 1 4	Rebate 7in. girt for frame.				
2 1 1					
8 1 5	Plain face.				
2 8 1 4	Moulding 10in. girt.				
2 8					
5 7	Plain faced, narrow.				
2 11					
9					
1 3 1 9	Stone as last in reveals.				
1 2					
1 2					
1 3 3 5	Add (bonder).				
11					
9					
1 6 2 1	Add.				
1 1					
1 2					
1 9 4 5	Add (bonder).				
11 8					
2 2					
9 3					
2 5					
1 2 5 8					
2 3 8	Beds and joints.				
2 10					
1 2 6 7					
19 2					
3 0 6 0	Labour rebate for frame 7in. girt.				
11					
1 3 2 4					
1 2					
1 3 2 11	Plain face.				
11					
1 6 2 9					
1 1					
1 9 3 10					
11 10					
1 3 2 6	Moulding 10in. girt.				
1 3 2 6	Stopped do. do.				
1	Stops to do. on splay.				
11 110	Stopped moulding 8in. girt.				
1	Moulded stops to do.				
2 6					
5 2 1	Plain face, narrow.				
10					
7 1 0	Add.				
8					
9 1 0	Add.				
9					
1 9 2 8	Plain face.				
5 3					
8 6 44 8	Deduct extra to red brick facing.				
8 8	Circular fair cutting in red brick facing over arch.				
5 3					
8 6 44 8	1 bk. deduct.				
4 3					
8 9 37 2	do. do.				
6 8					
4 2 6	Semi-axed arch in two half-brick rings in stocks.				
7 10					
9 5 11					
5 5	Semi-centre, 4½in. soffit for brickwork.				

ft. in. fr. in.					
4 3 14 2	Deduct extra to red brick facing.				
13 4	Circular fair cutting.				
3 0 7 2	1½ brick deduct.				
9 5					
9 7 1	Circular axed arch in two half-brick rings in stocks.				
11 10					
9 8 11					
9 5					
7 1	Circular centre to brick arch.				
2 1 0					
4 3					
1 0 1 2	Stone as last in arch.				
2 1 7					
4 3					
1 0 1 2	Add.				
2 1 10					
9					
1 0 2 9	Add.				
2 1 6					
9					
1 0 2 3	Add.				
7 4					
2 1 6					
1 0 3 0					
2 1 7					
1 0 8 2	Plain face.				
2 1 10					
1 0 3 8					
2 1 6					
1 0 8 0					
12 10					
2 1 6					
1 0 3 0					
2 1 7					
1 0 3 2	Beds and joints.				
2 1 10					
1 0 3 8					
2 1 6					
1 0 3 0					
12 10					
13 4					
4 3 5 0	Circular sunk joint.				
7 11					
4 3 3 0	Circular sunk face.				
7 11	Circular centre 4½in. soffit to stone arch.				

### THE ALLEGATIONS AGAINST THE LONDON SCHOOL BOARD.

THE London School Board sat in committee on Tuesday to consider and "investigate any allegations of corruption," when letters were read from 24 members of the Board, stating in effect that they had no information on the subject. Mr. W. Bousfield, chairman of the Works Committee and of the Special Committee of Inquiry into the Works Department, said there had undoubtedly been scamped work in the erection of some of the schools, and this must have been known to the clerks of the works then employed by the Board to supervise the building. None of the officers now in the employ of the Board were responsible for cases of dishonest building.

Mr. Hindley, of 290 to 294, Oxford-street, W., wrote that, being invited to tender for some work, he heard, while preparing the estimate, that it was all arranged that another firm was to have the work. He informed one of the responsible School Board officials of this before the estimates were sent in, and was assured that there would be fair play, but he was surprised to find that what he had stated was actually carried out, though not by quite the same means as he had expected, and although his estimate was settled upon by the committee, another estimate was afterwards produced and accepted by the Board. That estimate was the one from the particular firm which he had heard it was arranged should have the work, and who did not manufacture their own work. The treatment he received from one of the School Board officials when endeavouring to inquire into the matter confirmed the opinion he had already formed as to the method in which the work of the Board was done. Mr. Hindley added that he should be prepared to come forward to give evidence when the whole subject was before a Royal Commission. In a second letter, Mr. Hindley stated that his tender was the lowest; but that after it was accepted another tender was "discovered" which was lower; and that when he called at the office for an explanation, he was kept waiting two hours and then refused all information, being referred to "the person who gave him the rest of the information."

Messrs. Cox and Woolard, Benham-grove, Thornton Heath, drew attention to the tenders for the Hollydale-road School at Nunhead, asking why their tender of £109 was passed and

another of £135 accepted, when in almost every other case the lowest tender was accepted. The letter added, "perhaps, had ours been a big firm, with a little influence behind us, we might have been in the know a little earlier." A letter dated from the Borough, and signed "J. M. Smith," stated that the writer could furnish particulars of the proceedings of an officer of the Board, who invariably received three payments upon the large amounts included in the estimates as provisional sums. This was accomplished as follows:—His commission included a percentage upon provisional amounts, and was paid from the first instalments received by the contractor. When adjusting the accounts a deduction was made of all the provisions, and 2½ per cent. was claimed upon the deductions. Another charge was made upon the net amount expended out of the provisions. A statement should be called for from the various builders to show the amounts paid to the surveyors for squaring up schools. It would be found that the official in question generally managed to get 50 per cent. more than other similar officers. The largest school fell to this gentleman, probably owing to his intimacy with another official. The letter concluded by expressing the hope that full inquiries would be made, which might unearth more mysteries, especially if a cheque book were called for. With one dissentient the committee decided that the various complaints received be reported to the Board, with the recommendation that they be referred to the various committees concerned.

### BUILDERS' BENEVOLENT INSTITUTION.

THE forty-first annual meeting of this Institution took place on the 26th July at Willis's rooms, St. James's, Mr. H. H. Bartlett, the president, in the chair.

Major Bruton, the secretary, read the annual reports, which stated that the income had not been sufficient to maintain the charity, and that recourse had to be made to the remainder of the reserve fund to meet the liabilities for the support of the pensioners. That fund was now entirely exhausted, and an urgent appeal was made for sufficient funds to carry on the Institution for the forthcoming year. Should the appeal not be liberally responded to, some of the funded property would have to be realised, a misfortune which well-wishers of the Institution would much regret. During the past year the committee had only been able to recommend the election of two men, although there were several candidates, and three widows of pensioners had been placed on the pension list. The number of deaths of pensioners had been eight; the total number now on the funds being 28 men and 35 women. The committee offered their grateful thanks to the president, Mr. H. H. Bartlett, for the kind interest he had shown for the prosperity of the Institution, and with great satisfaction announced that Mr. J. Howard Colls would be the president for the ensuing year. The annual dinner would be held, with the consent of the Court of the Worshipful Company of Carpenters, at their hall, on the 29th of November next.

The report and accounts were adopted on the motion of Mr. George Plucknett, J.P., seconded by Mr. T. Stirling. Votes of thanks were passed to the president for the past quarter, Mr. H. H. Bartlett; to the vice-presidents, to the trustees, and to Mr. Plucknett, the treasurer, who was re-elected. Votes of thanks were also passed to the committee, the retiring members being re-elected, with the addition of Messrs. W. Brass and G. Wall; and to Messrs. Ward, Duffield, and Baldwin, the auditors.

The Chairman proposed as president for the ensuing year Mr. J. Howard Colls, who, he believed, would do his utmost to further the interests of the Institution. The resolution was unanimously agreed to, and with a vote of thanks to the chairman the meeting separated.

A new hospital has been erected at Merthyr Tydfil, and special attention has been paid to the ventilation, Messrs. Robert Boyle and Son's latest improved patent self-acting air pump ventilator being adopted for the extraction of the vitiated air.





THE BARONS HALL, PENSURST. View from the Minstrel Gallery

John W. Little, New York, et del.



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OUR LITHOGRAPHIC ILLUSTRATIONS.

THE SANCTUARY, DURHAM CATHEDRAL.

LAST year (in our issue of March 4, 1887), we printed, from the exhibition of the Photographic Society of Great Britain, in Pall Mall, a fine view of Durham Cathedral, showing the grand nave of that magnificent building. To-day, by the courtesy of the photographer, Mr. Wm. McLeish, of Durham, we are enabled from the same collection of notable photographs, to give a double-page plate of the Sanctuary in this cathedral, looking into the Chapel of the Nine Altars (A.D. 1242-1290), which, from all accounts, was designed by Bishop Poore, who issued indulgences to raise money for its erection in 1237. Thomas de Melsonby was prior during the early part of the work, which is of the finest Early English character. The mixed architecture of the choir adds particular interest to the church, and the new work of the High Altar Communion-rails and kneeling stalls furnish the sanctuary.

THE GRAND ORGAN FOR THE TOWN HALL OF SYDNEY, NEW SOUTH WALES.

THIS magnificent instrument will not only be the largest ever built for an English colony, but will also, it is hoped, be the grandest organ yet constructed, both as regards tone and mechanical refinements, for any building, sacred or secular. It will contain 126 speaking stops, distributed between five manuals and one pedal clavier, besides numerous accessory couplers and other movements. It will thus greatly exceed in dimensions the organs in the town halls of Melbourne and Adelaide, both built by Messrs. Hill, which contain 66 and 38 sounding stops respectively. Perhaps the most remarkable feature in the specification is the 4ft. reed on the pedal, which, it is confidently believed, will have a great effect as a bass for the full organ. It will be a striking reed of true length. The organ is being constructed entirely on the pneumatic principle, of a kind specially devised by the builders, and will be blown by a gas-engine. The case has been designed by Mr. Arthur G. Hill, F.S.A., and accepted by the Municipal Council. It will be of great size, and hold, in the centre, the 32ft. metal pipes. The style is Northern Renaissance, of the fine type seen more especially in 17th-century German work.

NETLEY CASTLE, HANTS.

THE accompanying drawing represents Netley Castle as now being enlarged and altered, from the designs of Mr. Sedding. The original structure, erected in Henry VIII.'s reign, was of comparatively small dimensions, built near the Solent, with very thick walls for purposes of defence. This structure had been since enlarged at various times. The present works

embrace the addition of a story in the two wings of the structure, with turret staircases to the same, as also extensive alterations in the external design, the heightening of the tower, the addition of new offices, and the remodelling of the fittings in the interior of the house throughout. The work is being carried out by Mr. Bone, of London, from the architect's designs.

GLOUCESTER BATHS.

WE illustrate the selected design for these buildings, as modified for execution in accordance with the instructions given to the architect, Mr. J. Fletcher Trew, M.S.A., of Gloucester. The front block of the buildings facing Barton-street will contain two first-class and four second-class private baths for each sex, with separate entrances, waiting-rooms, and lavatories, also caretaker's rooms, ticket office, &c. These private baths will be supplied with hot and cold water, and will be well lighted from the street and from an open space between the front and main blocks of the building. The main block of the building will comprise two swimming-baths of exactly the same size, each having an internal measurement of 100ft. by 46ft., and an actual water space of 82ft. 6in. by 28ft. 6in., varying in depth from 3ft. to 6ft., and holding 70,000 gallons of water. These baths will be lighted from the roof and gable ends, and well ventilated and warmed. The ponds will be lined with glazed bricks of a cream or ivory tint, and the platform round the ponds will be finished in impervious cement concrete paving. Dressing-boxes will be provided along one side of each bath, and may be added on the other side if required. The roofs, which will be boarded and slated, will be supported on strong iron principals 10ft. apart on brick piers 2ft. by 1ft. 6in., connected together by 14in. walls. The Turkish bath has been carefully planned to fill the rather awkward piece of ground between the swimming-baths and Prince-street, and will contain three hot rooms, with shampooing and cooling rooms, dressing boxes, &c. An additional separate entrance from Barton-street will be provided, and may be used if necessary. The engineering work will include a large steam boiler for warming the buildings and heating the water in the swimming baths, and the water required for the private baths, laundry, &c. Provision is also made for fixing a duplicate boiler, if required, at a future time. The steam laundry will be complete with modern appliances, including steam washing, wringing, and mangling machines, and steam drying closet. A service subway will be provided under the Turkish baths between the laundry and the front block of the building, to facilitate the collection and distribution of towels and other stores, &c. The proposed baths will afford the desired accommodation for all classes of bathers in a complete and convenient form, and the general arrangement and fitting-up of the baths will enable the corporation to work them with a small staff and at a reasonable cost.

"BUILDING NEWS" DESIGNING CLUB: COTTAGE FURNITURE.

THIS drawing illustrates the designs placed second in the last competition for a Gardener's Cottage and its Furniture. A review of the designs submitted, together with illustrations of the chosen ones, will be found in our issue for July 13th, and we shall publish the Cottage plan placed second at an early date. "Boreas" is the motto of the author. The drawings will explain themselves, and we have already remarked upon them in the above named notice.

On Saturday, the ceremony of blessing the foundation stone of the new Catholic Church of St. Benet's, Monkwearmouth, was performed by Dr. Wilkinson, Bishop-Auxiliary of Hexham and Newcastle. The new church will accommodate 1,000 worshippers. The style of architecture will be Early Gothic. Messrs. Dunn, Hanson, and Dunn, of Eldon-square, Newcastle-on-Tyne, are the architects. The contractor is Mr. T. Lumsden, of Jarrow-on-Tyne.

Dissolutions of partnerships are announced in the cases of the following firms of builders:—J. P. Wells and S. B. Chappelow, trading as Prestige and Co., Grosvenor-road, Piccadilly; and F. Harrison and W. H. Hughes, Arthur-street East, London Bridge.

BARONS' HALL, PENSURST, KENT.

THE Barons' Hall, Penshurst Place, was built by Sir John de Pulteney under a license to crenellate from Edward III., between 1341 A.D., when the license was granted, and his death in 1350 A.D. The interior of the hall measures 64ft. by 39ft., and is 64ft. high from floor to ridge of roof. It is covered by an exceedingly massive oak roof with curved ribs, terminated by quaintly carved corbel figures of oak. The floor is still paved with the original square tiles, and one end is raised forming the dais on which was placed the high table. The side tables and benches are stated by Parker to be the oldest English furniture extant, being of the same date as the hall itself. The iron fire-dogs are still to be seen in the middle of the hall, bearing the Leicester crest.

The oak screen at the other end of the hall partitions off the doors leading to the buttery hatch and kitchen, and forms a passage through the hall. The screen also bears the Leicester crest. This hall, here shown by drawings by Mr. J. W. Little, gives a good idea of what the chief room of a feudal baron's house was like in the 14th century. It is now in the possession of Lord de L'Isle, and was restored by the late Mr. Geo. Devey. Views of Penshurst Place were given in the BUILDING NEWS for Sept. 24, 1886, with an account of its history.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

A SPECIAL general meeting of the donors and subscribers was held at the offices, 21, New Bridge-street, E.C., on Tuesday last, July 31st, Mr. E. C. Roe (of Messrs. Geo. Trollope and Sons) in the chair, in the absence of the president.

The secretary having read the advertisement convening the meeting, the minutes of the last general meeting were read, confirming the election of Messrs. J. Howard Colls, Thos. F. Rider, and Wm. Robert Freeman (J. Mowlem and Co.) as trustees of the Institution, in succession to the late Mr. Benjamin Colls (who died some years since) and Messrs. Edward Conder and Arthur Cates, who have recently resigned. Three of the original trustees—viz., Messrs. G. S. Pritchard, Charles Richardson, and W. C. Anderson, who were appointed at the foundation of the Institution in 1866—still retain office, and, together with the three gentlemen recently elected, make up the number of six trustees as required by the rules.

The election of a pensioner—Mrs. Louisa R. Styles—to the widow's pension then took place by show of hands, the amount being £20 per annum. The election of Mrs. Styles makes up a total of seventeen pensioners now on the books of the Institution.

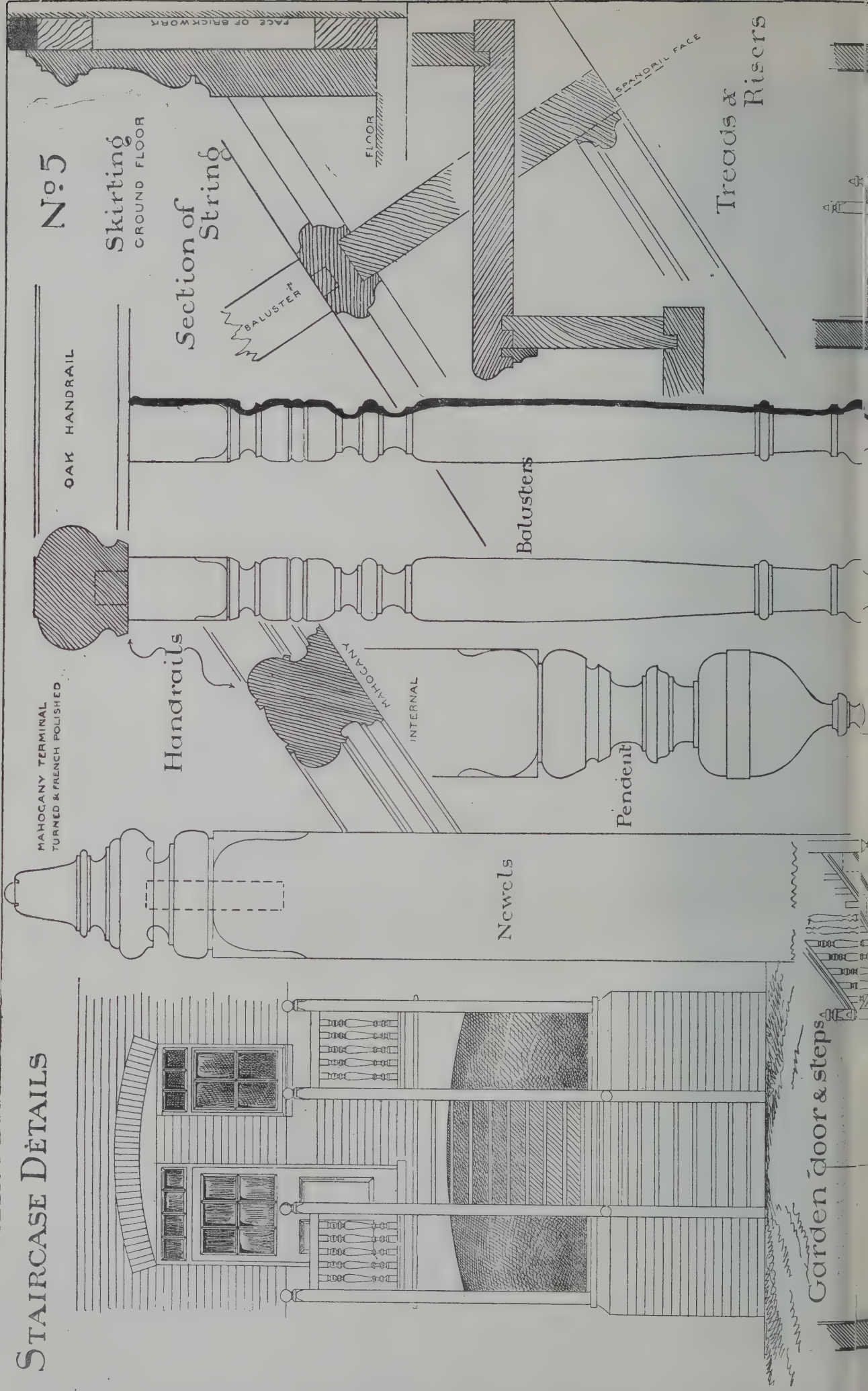
At the conclusion of the business a vote of thanks was presented to the chairman for his kindness in presiding, and the meeting closed.

BOOKS RECEIVED.

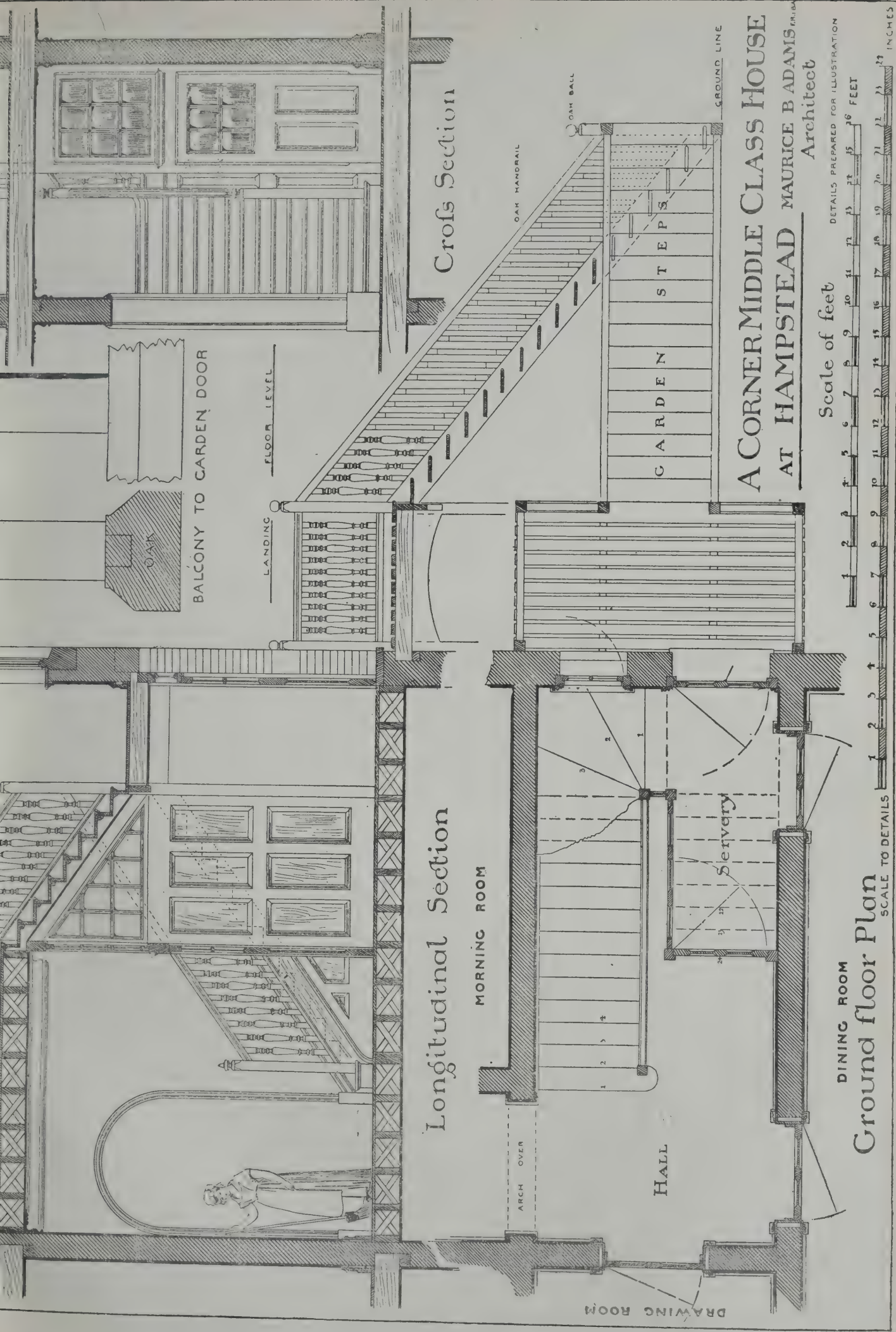
*Gwilt's Encyclopædia of Architecture*. New edition. (London: Longmans, Green, and Co.) Mr. Wyatt Papworth has just revised and published, through Messrs. Longman, a ninth edition of the familiar "Gwilt," indispensable to every architectural student, and an easily recognised feature of every architect's library. The book retains its cumbersome plan of arrangement, and its awkward index by sections instead of pages, but has been considerably amended and revised, the number of pages being increased from 1395, in the last edition published in 1876, to 1443. The most important alteration is the revision and extension of the chapters on "Materials Used in Building" and "Use of Materials," wherein the information as to fireproof construction and sanitary matters is corrected in accordance with present knowledge. The section on "Specifications" has been recomplied, the lives of eminent architects have been brought down to date, as are also the publications, while the glossary of terms has been amended. We can find no allusion to the subject of Graphical Statics, now one of necessity to the student, and the chapter on Pointed Architecture remains as in former editions, inadequately treated. At two and a-half guineas the revised "Gwilt" cannot, however, be accounted dear.



# STAIRCASE DETAILS







A CORNER MIDDLE CLASS HOUSE  
AT HAMPSTEAD MAURICE B ADAMS ARCHT

DETAILS PREPARED FOR ILLUSTRATION



## ANCIENT HINDU ARCHITECTURE.

A PORTFOLIO of studies illustrative of an adaptation of ancient Hindu architecture has just been published by Mr. B. R. Harrington, C.E., of Lonsdale House, Norwich, whose endeavour, the preface tells us, has been "to introduce no foreign elements into his work, but to add only breadth, freedom, and intellectual thought to the indigenous architecture" of Hindustan in the hope that its ancient art may be so revived as to express the thoughts and feelings of the people. The magnificence of this ancient style is undoubted, and its decay and threatened extinction can but be a source of regret to the thoughtful and cultivated Hindu especially. The art has become already a tradition. The Mohammedan style superseded it, and modern European types of design have debased Hindu architecture out of recognition with its old-world grandeur of breadth, colossal power, and majestic massiveness. The Mohammedan conquest at the beginning of the 15th century commenced a rule which for four centuries dominated the art of the country till the developing works of the British engineer and enterprise of successive English Governments with their railways, canals, and other important works, introduced an alien art, on the plea that native designers are incompetent to adapt modern conveniences to their traditional methods, and hence the incongruous combinations of such styles as the Modern French Renaissance with the ancient Hindu. Fergusson lamented the gradual extinction of Hindu art, and the author of these drawings has shown great patience, much enthusiasm, and considerable skill in applying the indigenous style in its strict purity to the modern necessities of civil architecture with lofty apartments and well-ventilated rooms, spacious halls, and convenient buildings. The absence of plans in this portfolio prevents one from following the author's scheme in detail; but we have designs for a palace, the bath, the ghaat, some stables, a city gate, a municipal building, city chambers, and street architecture, all studied from the ancient Hindu style, which Mr. Harrington is earnestly labouring to revive in India.

## AIR ANALYSIS IN PUBLIC BUILDINGS.

A CHEMICAL and bacteriological report on the air of 26 public buildings in Newcastle-on-Tyne and Gateshead has been prepared for the North-Eastern Sanitary Inspection Association, Newcastle-on-Tyne, by Dr. P. Phillips Bedson, Prof. of Chemistry, Durham College of Science; Mr. Thomas Watson Lovibond, F.I.C.; and Mr. Walter D. Severn, Assoc. Norm. School of Science. The examinations were held in lecture rooms and places of amusement, churches and chapels, grammar, high, and board schools, hospitals, courts of justice, and dressmakers' workshops. The greatest increase of carbonic acid in the series of experiments was at St. James's Hall, after a concert, when in two hours the amount of carbon dioxide rose to 31 above the standard, 6 per 10,000 parts, which was taken as an obtainable condition of healthy air in inhabited places. The town hall, under similar conditions of use, shows also a much deteriorated atmosphere. The writers give the proportion of organisms found in the air examined, but point out that more importance should be attached to high carbonic acid than to numerous organisms. The amount of carbonic acid present, being the indicator and proportionate consequence of fouling either by respiration or combustion, may be taken as a fair criterion of the amount of contamination which has taken place. The number of organisms in the air is, however, largely affected by other influences than the fouling rate. The most important of these is the amount of mechanical agitation taking place. The investigations in hospital wards show a low amount of carbonic acid, but a high rate of bacteria, and it is curious to note that the ward giving the largest amount of carbonic acid, 12.2 per 10,000, is the only one examined in which recent ventilating appliances are employed. The ward is warmed by closed stoves; Boyle's ventilators and Tobin's tubes are used, but no mechanical aid is used to circulate the air. The bacteria in this ward are also the highest. Taking carbon dioxide as an indication of vitiation, churches appear to be quite as badly ventilated as an average

public hall, and much worse than the theatres. In schools the results vary very much, but there is a tolerably constant relation between the condition of the air and the class of school in favour of middle-class schools.

In conclusion, the examiners say: The total result of our examination of the air of public buildings in Newcastle-on-Tyne appears to show the almost universal need for some improved system of ventilation. In very crowded rooms occupied for hours at a time, like courts of justice, some mechanical means of removing foul air and supplying fresh seems imperative. The Assize Courts illustrate the advantages of such a system, for at 3.30 p.m. on a crowded day the carbonic acid was only 6.66. In churches, assembly rooms, and places occupied for a comparatively short time, good results might be obtained by capacious ventilating shafts well heated; but the advantages of a good mechanical system of ventilation are so great that it had better be employed. In schools of the better kind, where class-rooms and classes are comparatively small, the natural ventilation obtained by doors, fire-places, and windows, aided by Tobin's tubes and Boyle's valves, might suffice. In schools, where large numbers of children congregated, more efficient means become necessary, particularly if the children be dirty and ill-clad. In all cases it must be remembered that any system of ventilation to be of service must be used. Tobin's tubes are useless when closed. Ventilating shafts are not much use—indeed, sometimes act the wrong way if the heat at the bottom is not kept up. One essential in all systems of ventilation is the proper warming of the fresh air. If this is not done, the first cold day in winter is the signal for closing all ventilating apparatus for the season, if not for good.

## A NEW HANDBOOK OF DRAWING AND DESIGNING.

"ROUND as the O of Giotto" is an old saying, and it came about thus:—The great Tuscan art revolutionist is recorded on one occasion, when making an afternoon call, to have described a free-hand circle on the door-post instead of leaving a card, as a more proper person would have done. The absent friend, on returning, at once recognised the hand of the master, for, said he, "only a very great artist could have done this." Hence the saying above quoted, which supplies Mr. Charles G. Leland with the text for his treatise on "Drawing and Designing," just published by Messrs. Whittaker and Co. "Anyone," he adds, "who can draw an O or a spiral can draw anything"; and again, "Any person who is capable of learning to write may also by this system learn not only to draw, but also to design or to invent original outline decorative designs." In fact, thus easy is the course by which every lesson becomes so simple that it forms a gradual advance from the one preceding; and all that remains necessary is that each one, as it comes, shall be perfectly mastered and practised. Such are the terms of the preamble; but we can only confess to considerable disappointment at the result if judgment be formed from the specimens of design with which the teacher has illustrated his volume. More particularly is the paucity of originality in these designs apparent where the circle has been allowed full sway; indeed, to use the writer's own limitation, they look as if they really could "all be laid out or planned in the first place with a pair of compasses, or even with coins of different sizes." If the pupil finds the task difficult, let him practise with circles, triangles, and squares. He who can draw the volute or spiral can draw anything, and any child can do it who will try. Mr. Leland further informs us that his system "forms the alphabet of all the minor arts, such as modelling, embroidery, woodcarving, leather-work, inlaying, ornamental and practical working in wood, metals, &c., since anyone who can design simple patterns may with perfect confidence attempt any of them." "It has been successfully taught by the author to nearly two thousand pupils." "Give and take patterns," "tangential circle stems or touching curves," and "up and down and across" patterns are all very well; but mere patchwork, though kaleidoscopic, does not necessarily constitute even the basis of good decorative design,

and we are unable to follow Mr. Leland through all the "horizontal vertical squares," and diagonal intricateness of forms which seem to constitute so large a part of his "simplified" system. He gives several good, useful pieces of advice, no doubt, about the mere mechanical portion of his subject; but, like many another originator of new systems, he forgets that the best and most practical details included in his scheme are also common property, and can neither claim originality nor exclusive freshness of idea. Thus, in conclusion, he writes:—"If the pupil be first trained in circular outline, decorative design, and then in object drawing, more advanced geometry, and perspective, he will be far more skilled in a given time than if he had been put at all these together in the beginning. The writer says this from years of experience and earnest experiment." Every school of art teacher adopts exactly the same method, and we fail to see where the exact "system" comes in.

## PROPOSED ART CONGRESS IN LIVERPOOL.

A MEETING of the general committee having charge of the arrangements for the holding in Liverpool of the first Congress of the National Association for the Advancement of Art and its Application to Industry, was held on Monday in that city, Mr. P. H. Rathbone presiding. Mr. H. E. Rensberg, hon. sec., reported that the arrangements for the congress, which will be held at the end of November or the beginning of December, had been fixed as follows:—Monday: Opening address by the president of the congress, Sir Frederic Leighton, Bart., P.R.A. Tuesday: Morning, address by the president of the section of architecture, Professor George Aitchison, A.R.A.; afternoon, address by the president of the section of painting, Mr. L. Alma Tadema, R.A. Wednesday: Morning, address by the president of the section of applied art, Mr. Walter Crane; afternoon, address by the president of the section of sculpture, Mr. Alfred Gilbert, A.R.A., and combined meeting of the sections of art history and national and municipal encouragement of art. Thursday: Morning, address by the president of the section of art history and museums, Mr. Sidney Colvin; afternoon, combined meeting of the sections of architecture, painting, and applied art; afternoon, address by the president of the section of national and municipal encouragement of art, the Right Hon. A. J. Mundella, M.P. The ordinary meetings of the sections will follow the addresses and combined meetings. Mr. G. W. Moss had been appointed a vice-chairman of the executive committee, and Mr. F. J. Leslie an additional honorary secretary. The committee, after careful consideration, were of opinion that a sum of £1,000 was required for the purpose of the congress, and they proposed to raise it by the annual subscriptions of members of the association, by the contribution of associates, and by a donation fund.

The report having been adopted, the following gentlemen were appointed local hon. secretaries of the various sections:—Painting, W. Wardlaw Laing; sculpture, Charles Sharp; architecture, C. W. Blease; applied art, H. B. Bare; art, history, and museums, Chas. Dyal; national and municipal encouragement of art, P. H. Rathbone.

On Saturday, the Rev. Canon Toole laid the memorial-stone of a day industrial school in connection with the Manchester School Board. The school, which is being erected in Mill-street, Ancoats, will have accommodation for 400 scholars. The ground floor comprises the office and waiting-room, the dining-hall, with store-room, kitchen, plunge-baths, and lavatories. The schoolrooms and classrooms are on the first floor. The cost of the building will be £6,500. The architect is Mr. J. Lowe, of Manchester, and the builders Messrs. Robert Neill and Sons, of Strangeways, in the same city.

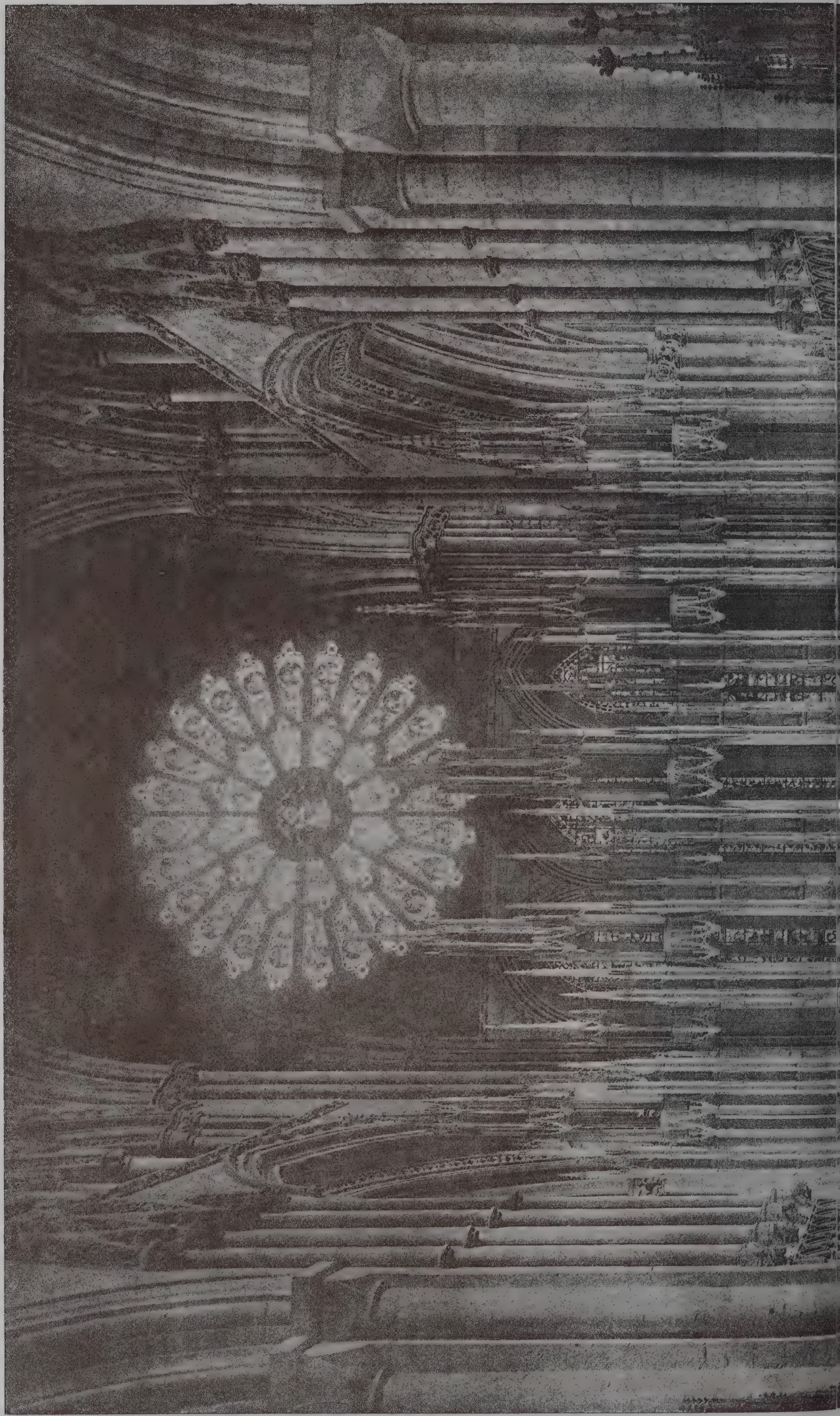
The completion of the Jubilee Clock-tower at Newport, Isle of Wight, has been celebrated by a dinner given to the contractor's men. The tower has been carried out from plans by Mr. R. Braxton Peers, and is in harmony with the adjoining town-hall, which was designed by Nash. The builder was Mr. T. Jenkins.



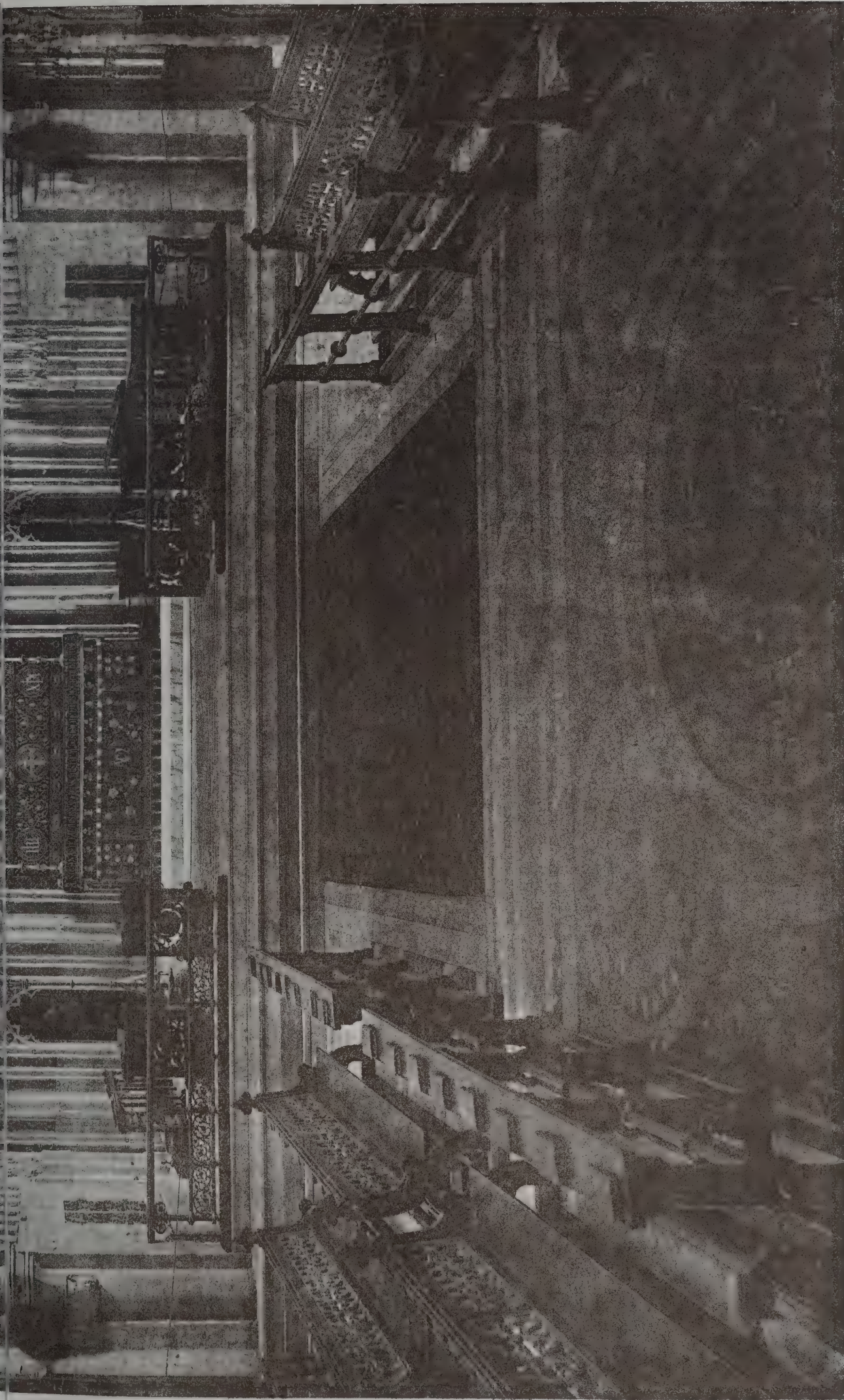




THE BUILDING NEWS, AUG. 3. 1888.







"Photo-Tint" by James Akerman, London, W.C

THE SANCTUARY, DURHAM CATHEDRAL.







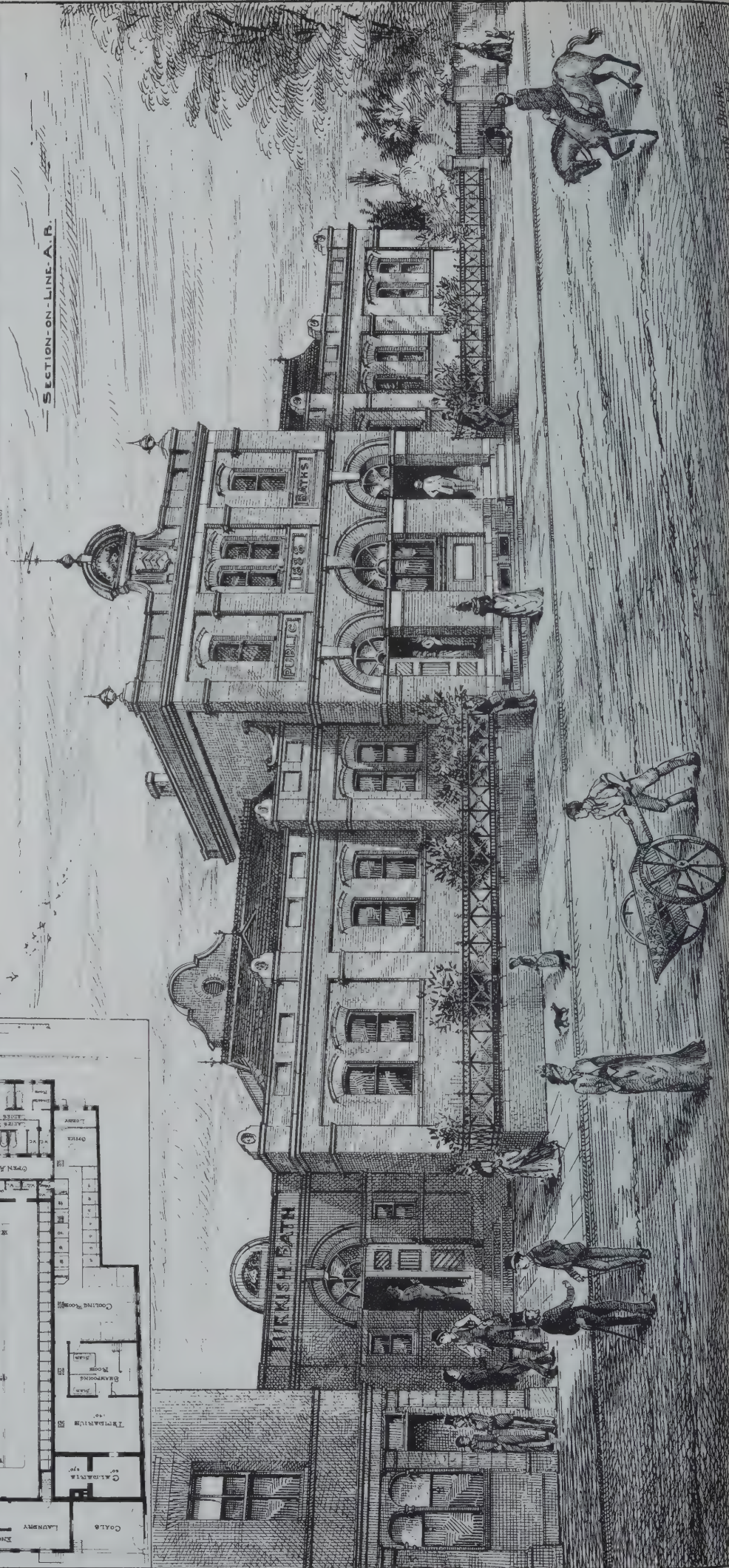
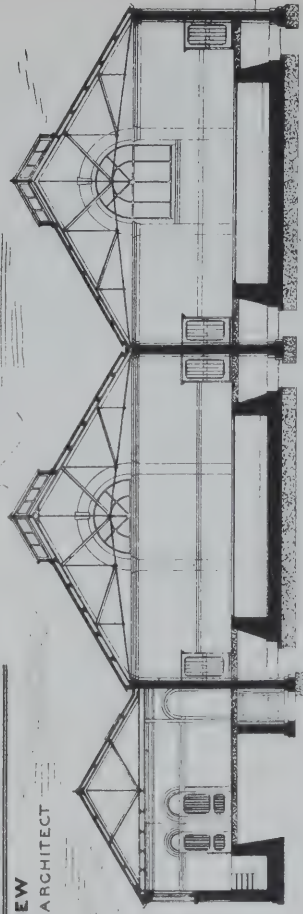
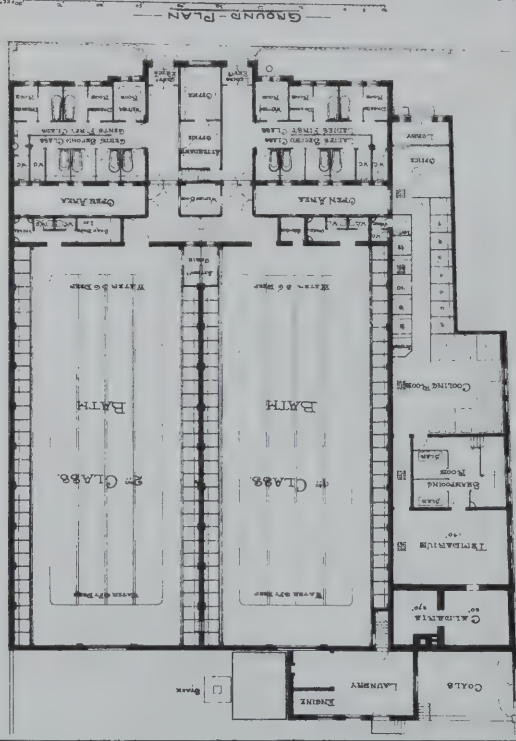




PUBLIC-BATHS · GLOUCESTER

**J. FLETCHER TREW**

ARCHITECT











CASE of the

GRAND

ORGAN for the

TOWN HALL

SYDNEY NEW SOUTH WALES

Arthur J. Hill



AUG. 3. 1888.





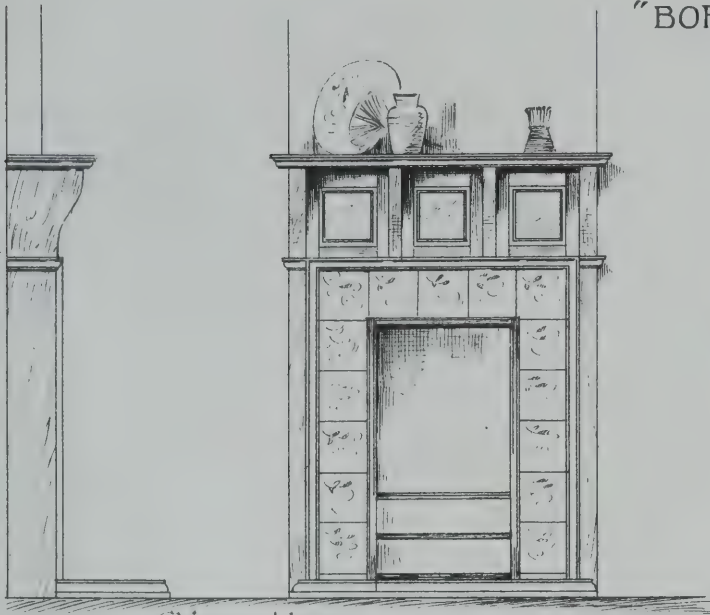




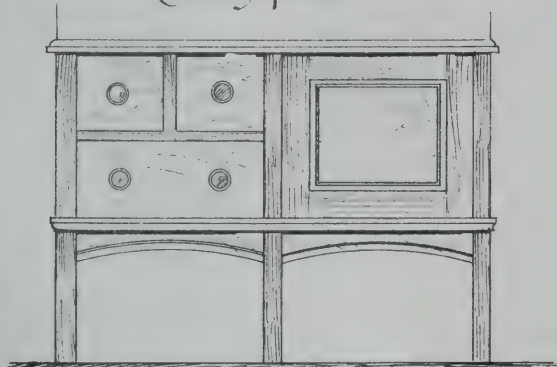
# "BUILDING NEWS" DESIGNING CLUB

## Living-room and Bedroom Furniture

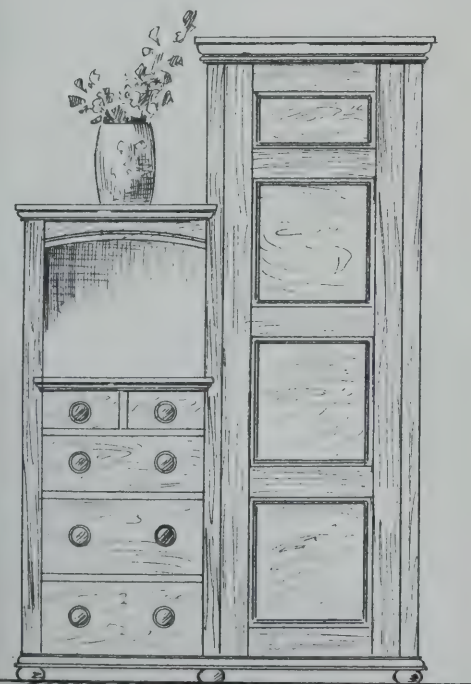
Scale  $\frac{1}{2}$  1 2 3 4 5 Feet



Chimney-piece

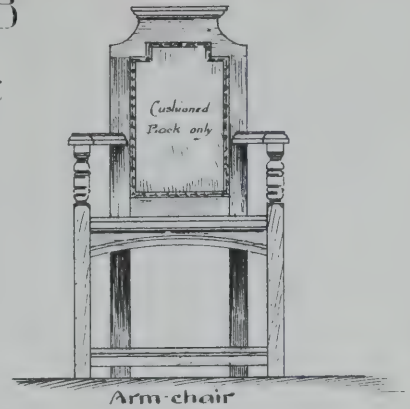


Toilet Table & Wash-hand Stand

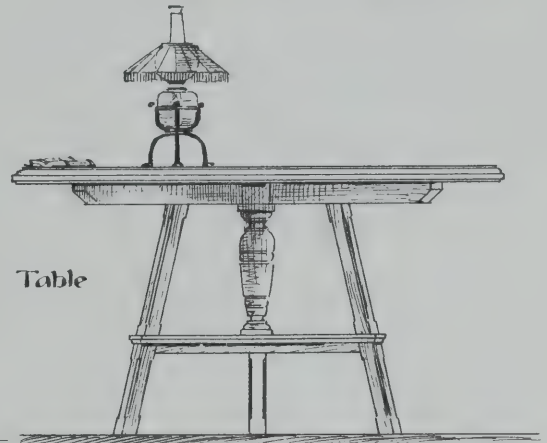


Wardrobe

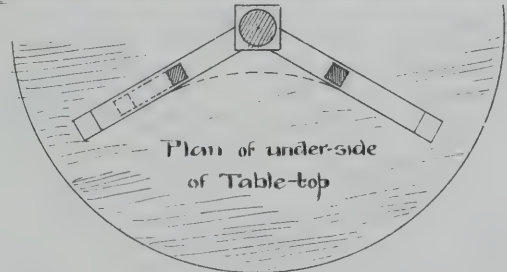
"BOREAS"



Arm-chair

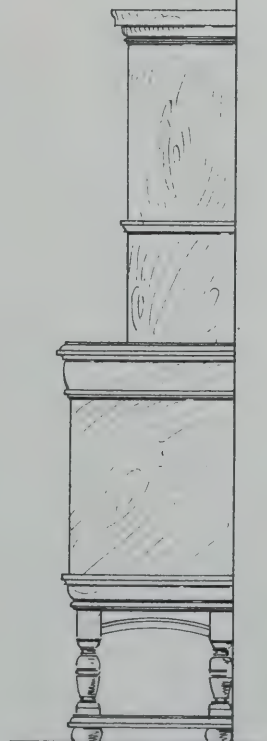


Table



Plan of under-side of Table-top

Placed Second



Combined Bookcase & Side-board













NETLEY CASTLE HANTS

FOR COL. THE HON. H. CRICHTON

J. D. SEDDING : ARCHITECT  
44 Oxford St.





Aug. 3. 1888.



Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.







# The Baron's Hall, Penshurst

## Detail of Roof

### cornice

MB The lower part of roof is covered with large  
 shingles  
 The middle part with smaller shingles  
 The top part with common tiles of late  
 date

The half plan and elevation of  
 crown post & moldings of  
 cornice, picture of the beam are  
 one quarter full size

### Plan

### Section into the Beam

### Profile

### Half elevation of Crown Post

Scale of feet 0 1 2 3 4 5 6 7 8 9 10 11 12 Feet

## Longitudinal Section



## MASONRY AND STONE-CUTTING.\*

By LAWRENCE HARVEY.

FOURTEENTH LESSON.

## THE RETURN ANGLE OF A CLOISTER.

WE now consider two vaulted passages, which (Fig. 81) form a return angle such as occurs at the angle of a cloister. One of the passages is narrower than the other, and is of semicircular section,  $A'Z'B'$ ; the square section of the other passage is the ellipse  $A''Z''B''$ , the axis  $O''Z''$  of which is equal to radius  $O'Z'$  of the first vault. The groin formed by the intersection of the vaults lies in a vertical plane, and it is projected in plan on the line  $CE$ . We draw the section of the first vault as any ordinary arch. We remind the reader that the radius of the extrados = thickness of the vault at the crown +  $\frac{1}{2}$  of the diameter  $A'B'$  of the arch. The bed-joints of that vault pass through the centre line of the vault. On the wider vault of elliptical section the joint lines will be at the same level as on the smaller vault; this determines  $M''$ ,  $N''$ , &c., on the square section. The surface of the joint will be a plane normal to the soffit of the vault, that is perpendicular to the plane tangent to the soffit along the joint-line. The joints  $M'Q'$ ,  $N'P'$  will be perpendicular to the tangent to the ellipse in the points  $M''$  and  $N''$ . These tangents can easily be found by means of the tangents in  $M'$  and  $N'$  of the semi-circular vault; for as the intersection of the vaults lies in a plane, the tangents to that intersection must lie in that plane. On the other hand, we know that a tangent to the intersection of two surfaces is the intersection of the planes tangent to those surfaces. The line  $T'T$  is the trace of the plane tangent to the first vault along the joint-line  $M'M$ .  $T$  is therefore the trace of the tangent to the groin in the point  $M$ . The trace of the plane tangent to the second vault along the joint-line  $M''M''$  naturally passes through the point  $T$ , the trace is therefore the line  $T'T'$ . Joining  $T'$  and  $M''$ , we get the tangent  $T'M''$ , to which  $M''Q''$  has to be at right angles. When two ellipses have an equal axis, as is the case here,  $O'Z' = O''Z''$ , the tangents, to point at the same level, cut that axis at the same level. For the tangent to the point  $N''$  we need only take  $S'Z' = S''Z''$  and join  $N'S''$ .

Now, the bed-joints of the second vault will be planes drawn through the joint lines, such as  $M''M''$ , and the normals, such as  $M''Q''$ . As the stones which form the groin have to take in a piece of each vault, it is desirable that the joint lines of the extrados should be on the same level in each vault. This determines the points  $Q''$ ,  $P''$ , &c., which form the outline of the extrados of the second vault. Now, the two joint lines on the extrados at the level of  $Q''$  and  $Q'$  meet on plan in the point  $Q$ , and, therefore,  $MQ$  is the projection of the intersection of the bed joints of both vaults at that level. If the points  $QPOpq$  be connected by a continuous curve, it will be the projection of the intersection of the two extrados surfaces.

The extrados of the second vault might be calculated so that its intersection with the extrados of the first vault be a curve in a vertical plane projected in  $CE$ . To do this the generator  $Q'$  of the extrados of the first vault would have to be stopped in the point  $R$  on the line  $CE$ , then through this point we produce the horizontal line  $RR'$ , which will be a generator of the extrados of the elliptical arch; its elevation  $R'$  is a point of the section of the extrados, which in this case will be an ellipse shown by dotted line. The joint  $M'Q'$  would have, in that case, to be prolonged to  $I'$ . Take  $I'$  on joint  $M'Q'$  of first vault at the same level as  $I''$ , and we shall find  $I$  the point on the plan where the bed joint of the first vault meets joint line on the extrados of the second vault. We see thereby that the joint line on the extrados of the first vault will have to ascend the extrados of the second vault from the point  $R$  to  $I$ , so as to get to the joint line of the second extrados.  $RI$  is a portion of the ellipse produced by the section of the elliptical extrados by the plane of the bed joint  $M'Q'$ . On this extrados the joint line of the stone would, therefore, form the broken line  $WIRL$ . This second mode of delineating the extrados is, therefore, rather more complicated than our former arrange-

ment, but it presents the advantage of thickening the larger vault in its lower part, and should always be adopted when there is a great difference in the span of the two vaults.

To continue our first construction, we draw the vertical joints, which are simply vertical planes, projected in  $LGHK$  and  $YVX$ . The polygon  $LQYXNH$  will then be the plan of one of the groin stones.

Now, if we consider a stone on the opposite side of the groin, such as the one of plan  $lgzanb$ , we shall observe that the intersection of the vaults forms a valley, as in the mitre of coved ceilings; whereas on the stone  $LQYXHL$  the intersection forms a projecting groin, as in the case of cross vaults. The angle of a cloister offers, therefore, a combination of both cases of intersection of vaults.

**Moulds.**—By unrolling the soffit of the first vault we get (Fig. 82) the mould for the soffit of that half of the groin stone. The joint line  $G\beta H$  (Fig. 81) becomes the straight line  $G_2\beta_2 H_2$  (Fig. 82), and the groin  $M$  and  $N$  (Fig. 81) develops into the curve  $M_2a_2N_2$  (Fig. 82). Then, making  $G_2L_2 = M'Q'$  and  $H_2K_2 = N'P'$ , we can draw easily the quadrilaterals  $G_2L_2Q_2M_2$  and  $H_2K_2P_2N_2$ , which are the moulds of the bed joints of that half of the stone. Similar moulds might be drawn for that part of the stone which belongs to the elliptical vault; but they are not required for working the stone.

As to the stone  $anlhgz$  on the opposite side of the groin, its moulds are given in Fig. 83, and the reader will observe that their outline coincides exactly with that of the first stone, but reversed, the concave lines of the first becoming convex in the second.

**Cutting of the Stone with the Help of the Square Only.**—Begin by working an operation prism (Fig. 84), the base  $X'Y'q'L'H'$  of which is equal to the outline  $XYQLHN$  of the stone on the plan (Fig. 81), and the height of which is equal to the difference of level between  $M'$  and  $P'$  on the section of the first vault. Then, on the one end the outline  $M'N'P'Q'$  of the head of the groin stone will be delineated. (In Fig. 84 the groin stone is turned upside down, with its further end towards us, so as to show its soffit.) On the other end the head  $M''N''P''Q''$  of the stone will be delineated. Then all the horizontal arrises  $M'M$ ,  $M''M''$ ,  $Q'Q'$ ,  $Q''Q''$ ,  $P'P'$ ,  $P''P''$ ,  $N'N'$ ,  $N''N''$ , will be delineated on the faces of the operation prism.

Guided by these lines, the soffit, starting from the head curve  $M'N'$ , can be worked either by means of a templet cut to the curve of the arch, and made to rest on the lines  $M'M$  and  $N'N'$ , or by repeating the head curve  $M'N'$  on the opposite face of the prism and working the stone with a straight-edge. Then the mould  $G_2M_2N_2H_2$  (Fig. 82) of the soffit of the semicircular vault will be squeezed in, and the groin line  $MN$  (Fig. 84) will be delineated. It is evident that the soffit of the second vault can now be cut with the help of a straight-edge guided by the head curve  $M'N'$  and the groin curve  $MN$ . In drawing the soffit mould, several points, such as  $a$ , should be marked to guide the straight-edge.

The upper bed  $N'P'P'$  is, in Fig. 84, placed below on account of the stone being turned upside-down. It is a plane easy to work by means of the arrises already delineated. The bed mould can then be placed on that plane, and its extremity  $NP$  marked, which gives us all the lines required for working the return of the bed in  $N'P'$ . As for the lower beds,  $M'MQ'Q'$  and  $M''M''Q''Q''$ , they comprise a valley. The first bed will have to be worked progressively from the edges  $M'M$  and  $Q'Q'$  until the bed mould can be placed thereon, taking care to keep the line  $MQ$  quite clear; then the other bed will be easily worked.

The extrados surfaces can be worked with the help of a templet and an extrados mould; but often the back of the stone is not worked at all, and the groin stone is simply finished by the horizontal plane of the operation prism.

The above method of working the groin stone is very accurate; but as it implies a waste of labour in working many operation planes, master masons prefer the next method, where the work is done with the help of bevells.

**Method of Working the Stone with Bevells.**—In this method the soffits of the stone are first replaced by two operation planes which connect the arrises  $MG$  and  $NH$ ,  $MV$  and  $NX$

(Fig. 81). If these planes be prolonged, the one would have the vertical trace  $M'N'$ , the other  $M''N''$  on the planes of the cross sections. The intersection of these two soffit planes is a straight line projected in plan on  $MN$ ; this line is the chord of the ellipse profile of the groin. To get the bevel required for working this stone, the solid angle comprised between the two operation planes must be measured. To do this we turn down the groin round the line  $CE$  (that is exactly equivalent to making an elevation of the groin, taking the line  $CE$  as ground-line), and we get the chord  $\mu'\nu'$ , and the horizontal joint lines projected on horizontal lines as  $\nu'\delta'$ . Now, if we take through a point  $\phi$  on the chord a plane at right angles with the chord, it will cut the joint lines in points projected on the groin elevation in  $D$ , and on plan in  $D$  and  $\delta$ . The lines connecting the point  $\phi$  with the points  $D$  and  $\delta$  measure the solid angle comprised between the soffit operation planes. When we turn up the plane with which we cut the solid angle, the point  $\phi$  comes to  $\phi'$ . That plane is then horizontal, and we get the solid angle in its real size in  $D\phi_2\delta$ . In this operation the line which connects the points  $D\delta$  is the hinge round which the plane is made to turn.

Now, having chosen a block of stone dotted on elevation, we work one of its sides to a plane, and mark thereon the outline of the soffit operation plane containing  $MM'$ ,  $NN'$  (Fig. 85), a quadrilateral easily drawn. Then, guided by the line  $MN$ , the operation plane of the soffit of the other vault will be produced. To work it, a bevel (Fig. 85) giving the solid angle between the operation planes is used. The length of the lines  $NN''$ ,  $MM''$  being measured off from the plan, the end joint  $M'N'P'Q'$  is worked square to the soffit operation plane, and the same is done for the other end joint  $M''N''P''Q''$ ; then the section of the vaults are placed on the respective head-joints, and the beds and soffits can be worked as described before. In this method, the only labour wasted on operation planes is that for the soffits, all other worked surfaces remain.

The groin stones on the valley side, such as  $anlhgz$  can be easily worked by the first method, but some care will be requisite to stop the soffits neatly at the groin line.

**The Key-Stone of the return angle (Fig. 81)** is worked like the other groin stones. In the key-stone of a crossing (Fig. 76) the soffit belonging to the semicircular arch is first worked right through its length. Then with a templet giving the elliptical profile of the groin, the two groin lines can be marked, and the soffit of the other vault can be worked therefrom. The key-stone of a rectangular dome is rather difficult to work on account of its soffit presenting four valleys. With templets giving the profile of the groins, chisel-chases must be worked down on the diagonals of the key-stone. These will then serve as guiding lines for working the cylindrical surface of the soffit between them. The most practical way of sinking curved chisel-chases is to sink several holes along the line of the depth requisite to reach the curve, then connect these holes together by removing the stone between them.

(To be continued.)

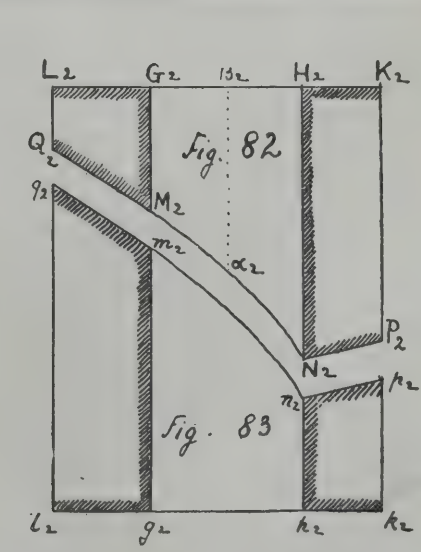
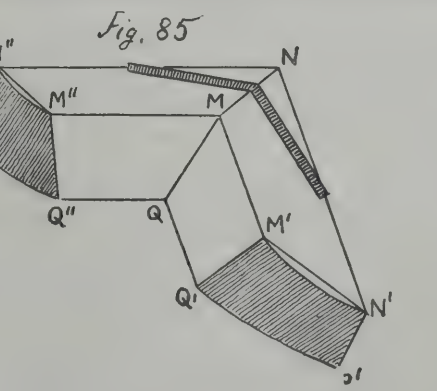
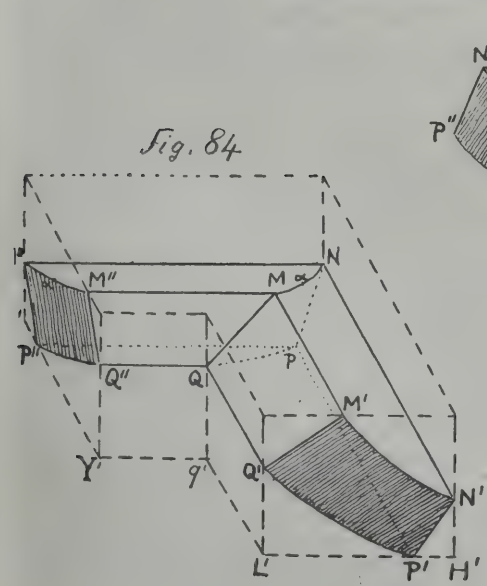
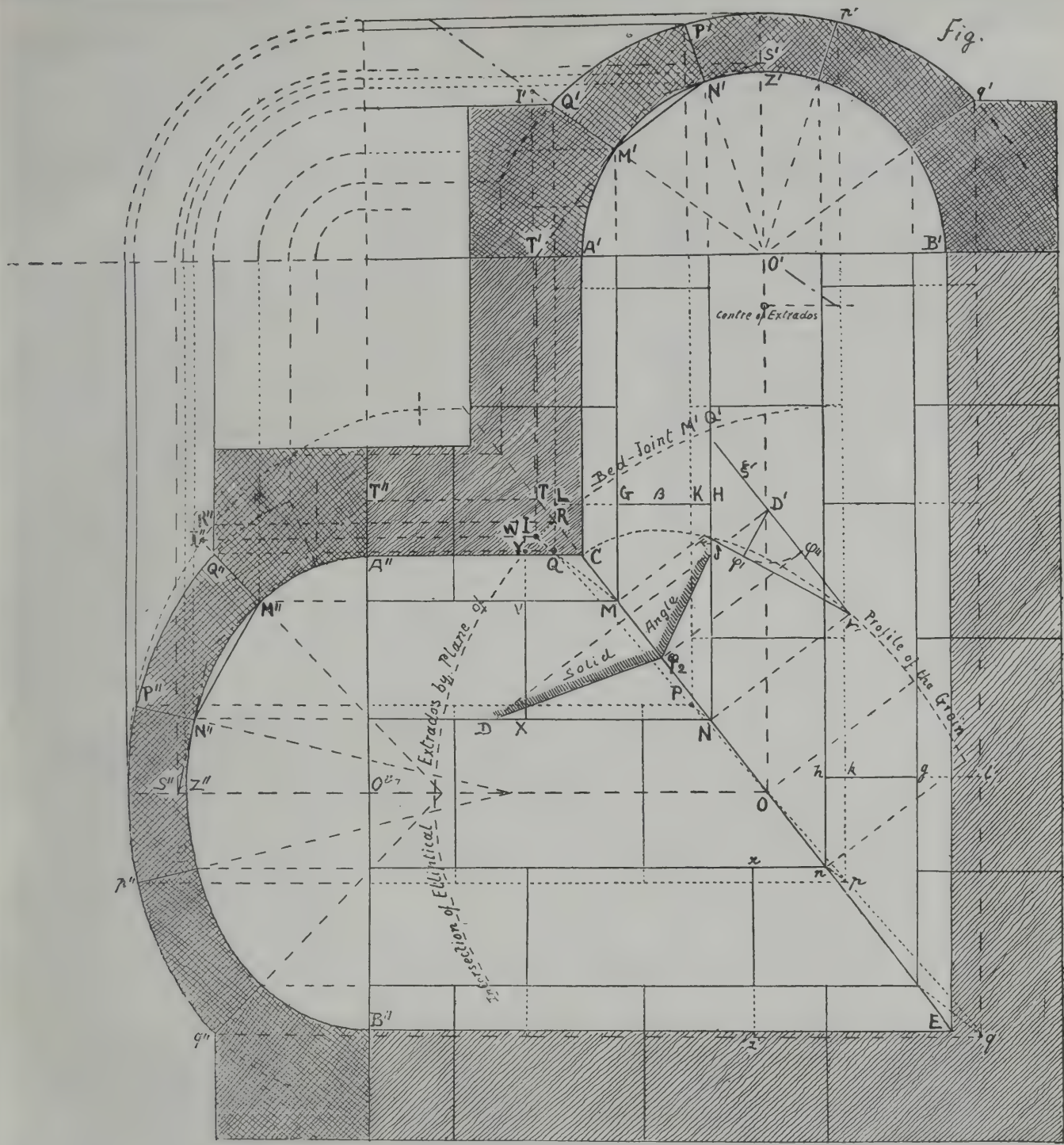
On Saturday the foundation-stone of a new school and parish rooms, to be erected in connection with Burley Church, Leeds, was laid by Mr. W. L. Jackson, M.P. The building, the plans for which were prepared by Messrs. Smith and Tweedale, of Leeds, will be faced with Horsforth stone and lined with 15in. brickwork. The school-room will be 63ft. by 33ft. 6in., and there will also be three classrooms, each 23ft. by 19ft. One of these classrooms, situated at one end of the large schoolroom, will be raised 2ft. 6in. above the general floor level, and will serve as a platform in the case of the schoolroom being used for public meetings, the two rooms being divided by revolving shutters when not so used. The total cost of the building and land will be about £3,000. The whole of the works have been let to Mr. Thomas Hannam, builder, Woodhouse, Leeds.

New Congregational schools and a lecture-hall are about to be built on the Vine Court Estate at Sevenoaks. The builder is Mr. W. Wiltshire, of that town, whose tender has been accepted at £1,555.

The Hon. John Collier has been selected to paint a presentation portrait of the present Lord Mayor.

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## Building Intelligence.

**BANGOR, BELFAST.**—A new Presbyterian church was opened at Bangor on Sunday last. It is built of Yorkshire stone throughout, with cutstone dressings from the Glebe Quarries, County Down, in the Early Perpendicular style. The building consists of nave, with double arcaded transept on either side, lofty arched choir platform, vestry, cloak-rooms, &c. From 600 to 700 people will be seated in the church. The upper stages of the tower are incomplete for the present. Its ground story forms one of the two porches. Internally the woodwork fittings generally are of pitch pine, having open bench seats for the congregation and choir stalls on platform, on one side of which is placed a oak carved pulpit. The roof is arranged in panels for future decoration. Each window has an illuminated design introduced into the central panel of the leadwork. Amongst the subjects selected are the burning bush and the dove; others have fruit and flowers. The glass is the work of the London and Glasgow Stained Glass Company. The general contractors were Messrs. H. Laverly and Son. Mr. Close, Belfast, is the architect.

**LONDON.**—The Suffragan Bishop of Marlborough consecrated the new Church of St. Philip in Buckingham Palace-road, on Thursday. The building consists of nave and chancel 120ft. long by 27ft. wide, and north and south aisles 13ft. wide; north and south transepts, morning chapel, and large vestries, with organ-chamber over. The accommodation is by chairs for 850 people, and the total cost will be about £8,000. The walls are faced outside with Gainsborough pressed-bricks, inside they are plastered, and have Bath-stone dressings; the core of the walls is cement concrete, bonded with hoop iron. The roofs are of pitch-pine covered with tiles, and the flèche, which rises to a height of 100ft., is covered with copper, by Messrs. Ewart and Son, of 346, Euston-road, N.W. The floors are laid with patent wood-block flooring. The heating is Grundy's hot-air system. Messrs. Macey and Sons, of the Strand, were the general contractors. Messrs. Demaine and Brierley, of York, are the architects, and Mr. T. W. Creed, the clerk of works.

### COMPETITIONS.

**CLAPHAM PUBLIC LIBRARY.**—In this competition the commissioners, acting on the report of the assessors, Messrs. Neighbour and Allcroft, have adopted the design under motto "Light," by Mr. E. Blakeway l'Anson, 7A, Lawrence Pountney-hill, E.C., and voted an "honorarium" of ten guineas to the author of the alternative designs, "Spes A." and "Spes B." Mr. John J. Jones, of Lydon-road, Clapham. Mr. Jones has since returned the cheque to the commissioners on the ground that, as the assessors reported that "Light" would exceed the stipulated outlay (£3,500) by £400, and that his designs were the only ones that came within the limit of cost, the sum of ten guineas was a "totally inadequate remuneration" for his services. The secretary to the commissioners replied, declining to enter into a controversy, and asking if he should return the cheque. In response, Mr. Jones expressed his surprise that such a question should be asked, and again emphatically declined to receive such an "honorarium." We reviewed the six designs submitted in our issue of the 8th June, p. 795, last vol.

**ROTHESAY.**—The Kirk-Session of the parish having offered three premiums for designs for the new church they propose erecting at Craigmare, the committee selected three designs, which were sent to a referee, who has given his award to the design marked "Clyde," Mr. D. A. Crombie, St. Andrew-square, Edinburgh, who has therefore been appointed architect. Mr. J. Bennie Wilson, Glasgow, and Mr. W. F. Gibbon, Glasgow, were awarded second and third premiums. The selected design is Gothic in style, with a tower rising 80ft. high. Accommodation will be provided for 633 sittings, and the cost is expected to be £3,433.

The annual meeting of the Kent Archæological Society was held at Hythe and its vicinity on Wednesday and Thursday.

## Engineering Notes.

**PRESTON.**—THE RIBBLE SCHEME.—The Corporation of Preston have come to an arrangement with Mr. T. W. Walker, the contractor of the Preston dock works, for the suspension of operations for twelve months, in accordance with the recommendations of the Select Committee of the House of Commons. The agreement for the suspension specifies that the men should cease work on the 28th (last Saturday); that there shall be paid about £34,500 to Mr. Walker as retention money; that there shall also be paid £5,000 for the maintenance of the works by pumping and by protecting the stonework from the effects of frost. Mr. Walker will not be responsible for the silting up of the new diversion. The new quay on the face of the diversion will be used as early as possible for the coasting traffic there is at present. The old quay is gradually silting up. As to the sewage scheme, by which the sewage of Preston is to be pumped up to the Freckleton farm of the Corporation, an application will at once be made to the Local Government Board for borrowing powers. This will cost about £100,000.

### ARCHÆOLOGICAL.

**KIRKSTALL ABBEY.**—The portion of the ruins of Kirkstall Abbey which the visitor sees near the entrance gate, to the right hand, is supposed to have been the corn mill, a supposition lately confirmed by the discovery of the conduit which led the water from the mill to the river. Where the Cistercian monks obtained the water to turn the mill does not appear at present; but last year the custodian of the ruins unearthed the waste water conduit to the north-west of the main building, taking two directions, one towards the river, and the other towards the bottom of the cloisters. The large blocks of stone which held the sluice doors by which the water could be turned in either direction, with the grooves in which the doors fitted, are there in position just as perfect as on the day they were laid. The supposition is that, when required, the water was turned in the direction of the Abbey for sanitary purposes, thus washing away the refuse into the adjoining river.

### CHIPS.

A public inquiry was recently held at Bishop's Stortford by Major-General C. Phipps Carey, one of the inspectors of the Local Government Board, into an application made by the local board to borrow a sum of £1,000 for the erection of new stabling, &c., for the board's horses. Mr. R. S. Scott, the surveyor to the board, attended, and explained the plans which he had prepared.

On Saturday afternoon the Marquis of Hertford laid the foundation stone of a new wing which is to be added to the Orthopaedic and Spinal Hospital, Newhall-street, Birmingham. The alterations and additions to be carried out will result in an expenditure of £800. Messrs. Sappcote, of Camden-street, Birmingham, are the builders.

Mr. F. Madex Brown has made considerable progress with the picture intended to be the tenth of those decorating the Town Hall of Manchester. The design represents John Kay, inventor of the fly shuttle, escaping from the fury of the mob when they broke into his house at Bury, Lancashire.

The members of the Hampshire Field Club held a meeting at Ventnor and Bonchurch on Wednesday week, when papers were read by Messrs. Norman, Colenutt, and T. W. Shore.

Mr. E. H. Shorland, of Manchester and London, has recently supplied his patent Manchester warm-air stoves to warm the day-rooms of Ballinasloe Lunatic Asylum, Mr. J. F. Kempster being the architect.

The Dowager Empress Victoria has singled out the Church of the Holy Sepulchre at Innichen, in the Tyrol, as the model of the mausoleum to be built over the tomb of the late Emperor Frederick. At the wish of the Empress, Baron Friedrich von Schmidt, the well-known Vienna architect, is making plans of the church.

Mr. Hutchinson, R.S.A., has just finished in the clay a portrait bust of the Queen for the Victoria Art Gallery, Dundee. Mr. Hutchinson has also been commissioned to execute a bust of the late Prince Consort for the same gallery.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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### ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLII., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., LI., LII., and LIII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—O. C. and Co.—F. I. G.—W. H. H.—W. G. and Son.—J. G.—J. W. and R.—W. E. R. and Co.—W. P.—W. I. and Son.—C. B.—C. N. and Co.—J. C. B.—W. W. and Son.

J. R. (We shall only be too pleased to publish in full any good design sent us, with detailed drawings, estimates, &c., just as we are doing with those Mr. Lovegrove has already given.)

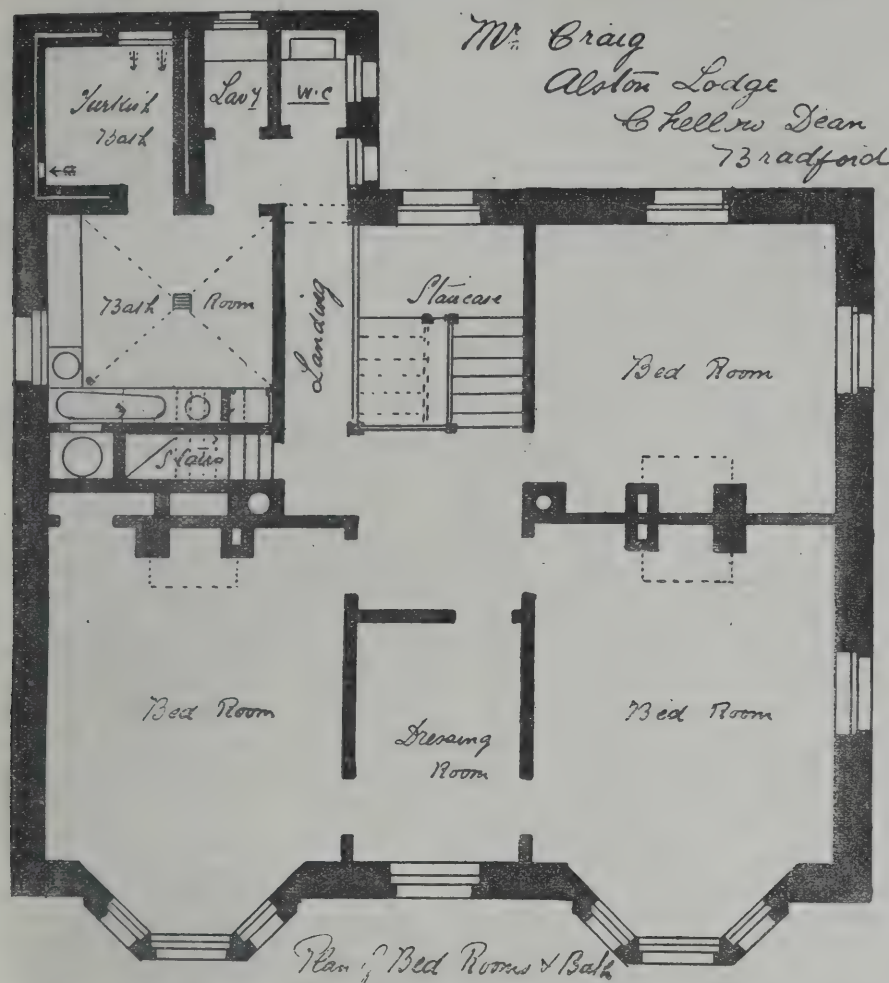
## Correspondence.

### REGISTRATION AND DISHONEST ARCHITECTS.

To the Editor of the BUILDING NEWS.

SIR,—I am glad to see, according to your report last week, the Society of Architects has passed a rule giving the Council power to deal with members proved guilty of unprofessional conduct. Not—to its credit be it spoken—that the Society needs it so far. Its only member concerned in the recent shameful revelations at the Board of Works—Mr. Walter Emden—appeared in a most creditable and very different capacity from that of some other architects implicated. I wonder if the Council of the Royal Institute of British Architects is busy framing a new rule for the benefit of some of its own members, whose irregularities have reflected such lustre on the body to which they belong, that it is so long taking action? When the Registration Bill comes before Parliament next, Mr. Emden and its other promoters may not unreasonably point out what, of course, we all knew long ago—that no professional body has ever yet had either the inclination or power to deal with such scandals as are now revealed, and that only a General Council of Architecture can be trusted to root out the black sheep of the profession. The black sheep know this well enough—hence their hearty and very natural opposition to registration.—I am, &c.,  
A REGISTRATIONIST.





## STRAINS.

SIR,—The two communications on "Strains" which have appeared in your columns have contained serious errors.

In the last half of the second communication Mr. Middleton professes to expound a new theory of shearing stress, which he naively remarks has apparently been overlooked by other teachers.

He attempts to prove that the shear at the centre of a uniformly loaded beam is  $\frac{W}{4}$ , and not  $nil$ , by calmly altering the conditions to that of a beam loaded at two points. Why he should not have selected the simpler case of a beam with one load at the centre to base his argument on is not clear, except that it might have led him into a difficulty unsolvable by his new theory. Unfortunately, the conditions selected to replace the actual conditions do not support his new theory, the shearing stress between two equal loads equidistant from the centre being  $nil$  and not  $\frac{W}{4}$ .

Mr. Middleton's scissors simile would have been a very good one had he properly applied it. Each blade of the scissors represents the vertical resultant of all the forces acting on its side of the section under consideration.—I am, &c.,

July 31.

H. C. SEDDON.

## PRIVATE TURKISH BATHS.

SIR,—In the able articles which have appeared from time to time in the BUILDING NEWS on the Turkish Bath the writer has confined himself chiefly to description of construction and ornamenting of large public baths. The Turkish bath has taken deep root in this country, and is a valuable institution. It is extensively used by all classes of the community—by peers and artisans—for sanitary as well as for remedial purposes. Every town of any pretension must now have its Turkish bath; many large towns have several, and the large, first-class hotels now find it necessary to have a Turkish bath annexed to their estab-

lishment, contributing so materially as it does to their success.

Private Turkish baths are greatly on the increase. Formerly, on account of the great expense of construction, a luxury like the Turkish bath could only be indulged in by the wealthy; but now a neat and efficient bath can be put up at a very moderate cost, and there is no difficulty whatever in heating such a bath with the same heating apparatus which warms the house. The hot air can be readily directed to the bath or to the house, as it may be required.

When a new house is in course of erection the hot-room may be arranged so as to adjoin the ordinary bath-room on the same floor as the bed-rooms. On reference to the subjoined plan the economy of such an arrangement must at once be clear to everyone.

In warming a house already erected we frequently make a small hot-room in the basement alongside the brickwork inclosing the heating apparatus. This room is invaluable to a family, as the valves can be closed, and the heat can be shut off from the rooms above and turned into this room. The necessary high temperature also can be raised in a short time to produce a copious perspiration. By this means a severe cold or chill may be conveniently and readily thrown off, and perhaps a serious illness avoided.—We are, &c.,

J. CONSTANTINE AND SON,  
Convolved Stove Works, 23, Oxford-street,  
Manchester.

## ST. MARY'S CHURCH, BRIDGEWATER.

SIR,—In your issue of the 20th inst., I observe that you have stated that the name of architect for the restoration or the above church is Mr. Gedding. Allow me to say that it is—Yours, &c.,

JOHN D. SEDDING.

447, Oxford-street, W., July 26.

## SOLICITORS' LIBRARY AT EDINBURGH.

SIR,—In your issue of the 20th, among "Notes from Edinburgh," you state with regard to the new library to be erected for the solicitors, "that the assessors, Messrs. John Burnet and Son, of Glasgow,

selected the design by Mr. J. B. Dunn, of George-street, Edinburgh."

As I did not select Mr. J. B. Dunn's, you will perhaps be good enough to correct this statement in your next issue.—I am, &c.,

JOHN JAS. BURNET.  
167, St. Vincent-street, Glasgow, July 27.

## Intercommunication.

## QUESTIONS.

[9695.]—**Shingled Spires.**—I should like to know of any old spires covered with shingles, how long they have lasted, the size generally used, and the wooden construction of spire. One or two authenticated examples would suffice. Is any preservative solution put on at first?—Q. E. D.

[9696.]—**Acoustics.**—Is there any rule to be observed in designing a concert-hall to prevent echo or too much resonance?—ARCHITECT.

[9697.]—**Haddon Hall.**—I shall be glad to know if any large details have been published of the woodwork. Is there any book published describing and illustrating this residence?—H. H.

[9698.]—**Surveying Instruments.**—Which are the most necessary for the use of a country practitioner in a small way of business? Is a theodolite really required?—ELLIPSE.

[9699.]—**Refectory.**—I should like to be informed if there are any apsidal-ended refectories in England. If so, where? Also, on what side of the cloisters was it usually placed?—MONACHISM.

[9700.]—**Quality of Woodwork.**—According to Gwilt's "Encyclopædia of Architecture," under the section "Specification," it states, in connection with the carpenter and joiner's work, that "the oak is to be of English growth, and the timber not specified as oak to be of the best Dantzic, Riga, or Memel yellow fir. No American, Swedish, or Scotch fir to be used in any part of the building." Is not a good deal of American timber used now in buildings, and is the above clause generally applicable at the present time, or ought it to be modified, and if the latter, in what way? It also states that the timber and deals are to be "entirely free from sapwood, shakes, and large knots, and all other defects." Is there such a thing for building purposes as wood entirely free, or should the clause be understood in carrying out work, to be very or fairly free, as in actual practice I find, in taking objection to wood, the contractor will reply that the work is very free, and it is unreasonable to expect better for structural purposes, as only for cabinet work can the material be got entirely free.—FAIRATION.

[9701.]—**Salting in Cement Work.**—I have a porch of brickwork (whether built in lime mortar or not I do not know) covered with Portland cement stucco. It has been built ten years; the undersides of the cornice and fans and soffit of entablature continue to be much disfigured with a white frosting similar to that which occurs on new brickwork. I have had front face and top surface of blocking, the top of weathering of cornice, and the back face of entablature inside the porch painted four oils; still the frosting is reappearing on outside, inside, and soffits of entablature and on soffits of cornice. Can anyone suggest some wash which will remove and neutralise this without altering the appearance of the surface of the stucco? The painted parts are mostly out of sight and finished the colour of the stucco, the object being not decoration, but to keep out the wet.—Z.

[9702.]—**Outside Plastering.**—I shall be glad to have the experience of any reader as to the behaviour of Parian or Keene's cements for outdoor stucco work. Also the best material that can be used for outside plastering to receive immediate painting.—OLD BUILDER.

## REPLIES.

[9692.]—**Californian Red Wood.**—Californian red wood is regularly on the London and Liverpool markets. It reaches us in planks of mixed lengths, breadths, and thicknesses, some of these, owing to the giant trees they are cut from, being 5ft. in breadth and perfectly sound and clean. The price is somewhat high, owing to the enormous distance it has to be brought to market. It ranges from, say, 3s. 6d. to 4s. 6d. per cube foot, the shippers stating that nothing short of the latter price is a paying one on this market. The American red wood "W. R." read about some years ago was no doubt the ordinary Quebec red pine, which, as he states, is good for timbering, joinery, external or internal, and even for piles for water work. This timber can scarcely be told from the Baltic red or yellow fir; but it is quite a different thing to the Californian red wood. The Californian red wood was brought into great prominence at the International Exhibition of Forestry held at Edinburgh in 1884. The bark of a gigantic tree was there set up, the floor being a section of the tree. This bark formed a large room, on the walls of which were hung scenes from the red-wood forests; planks of enormous size were exhibited, the plain and the highly-figured varieties being well represented. The Californian Redwood Co., of 406, California-street, San Francisco, exhibited a suite of rooms fitted up and furnished in this wood, the appearance of which, under dull or bright pile, was highly pleasing. This work was designed by Mr. Scott Marton, and, I believe, executed in Edinburgh, where a great number of the shares of this company were held. The finest and the only work to my knowledge on this particular wood was published by this company in California in 1884. It is entitled "The Redwoods of California: a Glimpse at the Wonderland of the Golden West," by G. W. Bounce, Eureka, California, a copy of which, illustrated by photography, I have before me. If "W. R." wishes for further information on this subject I can refer him to an article I wrote upon this wood for the pages of the *Timber Trades Journal*. It appeared in the numbers dated Sept. 27 and Nov. 8, 1884, the first cargo of this wood, consigned to Messrs. Churchill and Sons, of London, being then afloat.—W. STEVENSON, The Park, Scarborough.



## LEGAL INTELLIGENCE.

**RESPONSIBILITY OF QUANTITY SURVEYORS TO CONTRACTORS.**—**PRIESTLEY AND GURNEY V. STONE.**—(High Court of Appeal, July 30. Before the Master of the Rolls (Lord Esher), Lord Justice Lindley, and Lord Justice Bowen.)—This appeal, heard on Monday, was brought by a firm of builders, the plaintiffs in the original action, to set aside a decision by Mr. Justice Fitzjames Stephen, who sat without a jury, in January last, in favour of the defendant, Mr. Frederick Stone, A.R.I.B.A., a quantity surveyor, which decision if upheld would show that in law a quantity surveyor is not responsible to the builder for the accuracy of his quantity, and cannot be made liable for errors or negligence where fraudulent intent is not proved. In this particular case the plaintiffs tendered for the erection of a Roman Catholic Church at Chiswick; the quantities were prepared by Mr. Frederick Stone, the defendant, and were obtained at the offices of Mr. Kelly, of London and Leeds, the architect for the church, in the usual manner, on payment of a fee, the builders tendering understanding that whichever firm was successful in obtaining the contract should pay the commission out of the first instalment due to them on the architect's certificate. The plaintiffs tendered with other firms, and their tender was accepted. The quantities were soon found to be deficient in many particulars, and plaintiffs objected to pay defendant the balance of his commission without a letter promising to make good the deficiencies they alleged to exist in the quantities. The undertaking asked for was not given by defendant, and plaintiffs thereupon brought an action to recover damages for injury caused by the alleged negligence and breach of duty of the defendant as quantity surveyor in preparing an inaccurate bill of quantities. The defendant put in a counter claim for balance of his account. The plaintiffs based their claim upon the ground that the defendant, by preparing the bill of quantities represented that the same was correct, and would be sufficient for the building of the church according to the plans, and that it was the duty of the defendant to use ordinary care and skill in the preparation of the bill of quantities, knowing that tenders would be made upon the faith thereof. The defendant, in his statement of defence, denied that he was negligent, and said that there was no privity of contract between him and the plaintiffs, and that he did not owe any duty to the plaintiffs. He also denied that there was any inaccuracy in the bill of quantities, and alleged that the plans were altered after the quantities had been prepared. At the trial in the Court of Queen's Bench, before Mr. Justice Stephen without a jury, the judge directed a nonsuit to be entered, and gave judgment for the defendant upon the counter-claim. (See article in the BUILDING NEWS for Jan. 27 last, page 185, Vol. LIV.) The plaintiffs now appealed. Mr. Edwyn Jones as before argued for plaintiffs, urging that, owing to the case having been stopped by the learned judge, material points affecting custom as to quantity surveyors' liability for gross negligence were not sufficiently brought out. The mode in which the quantities were prepared before the specification was written showed, he urged, that many of the items were mere guesswork, and that in itself, if proved, would amount, he submitted, to gross negligence. Certain necessary features, such as the corbelling for stone cornices and works in hoop iron, were deliberately omitted from the bill of quantities—it was said by instruction of the architects. Plaintiffs tendered in good faith that the quantities contained all the work required, whereas, owing to defendant's negligence, it did not. He quoted the case of "*Scrivener v. Pask*," heard before Mr. Justice Blackburn and also that of "*Heaven v. Pender*," which latter case went to show that where one person was so placed with regard to another that he would occasion injury to that person unless he used ordinary care and skill, a duty arose to use ordinary care and skill to avoid such danger. He also drew attention to the eleventh clause of the contract, which provided that there should be no remedy as against the building owner for any mistakes in the specification or other documents. Mr. Spokes, for the defendant, was not called upon, the Court being unanimous in dismissing the appeal. The Master of the Rolls said that the course pursued by counsel was very unfair to the judge, for from the notes there appeared no symptom that the action was abruptly stopped. The case of "*Heaven v. Pender*" had no more to do with the present action than with one of breach of promise of marriage. The custom of employing a quantity surveyor had been in existence for sixty or seventy years, and hitherto no single case had been brought by a builder to fix the responsibility on the quantity surveyor for accuracy, which was sufficiently strong to show what the custom was. The contract as to taking out the quantities was not made between the quantity surveyor and the builder, but between the architect and quantity surveyor. The architect selected a man to take out the quantities, and employed him, and the quantities were handed to the architect. The quantity sur-

veyor had no control over the way in which the bill of quantities might afterwards be used, and had no knowledge as to the persons to whom they might be submitted. Indeed, it might chance that the proposal to build would be abandoned, and they would never be used at all. As a fact the quantity surveyor did not know that his quantities would be used by anybody, and certainly whether they would fall into the hands of any particular person. They did not, therefore, amount to a representation that they were true in fact. They were given to the architect, who could check them, and no action for false representation apart from fraud could be based upon their alleged deficiencies. If wrong as against the building owner, the architect would be guilty of negligence, and if deficiencies in the quantities were fraudulently made, it was possible that the builders would have cause of action, but their case at the trial was not put on any such ground of fraudulent or even reckless statement. It had been arranged that in this case the amount of damage involved by the alleged negligence should be left to be determined by the official referee after a decision was given by the judge on the liability of defendant, but no evidence of reckless misrepresentation as to the quantities was given before the judge; there was no representation to the architect, and none at all to the world at large, as represented by plaintiffs, for as he had already observed, the quantity surveyor was not bound to conclude that his bill of quantities would be shown to any builder by the architect for whom it was prepared, for the architect might alter the proposed work before sending out the quantities to the builders. For all these reasons such an action as this had never been maintained, and hardly ever proposed. This was an attempt to manufacture a new case, in which out of a hundred actions not one would stand, and it was one which the Court would not sanction.—Lord Justice Lindley concurred, holding that the decision of Mr. Justice Stephen ought to stand. There was no privity of contract between the quantity surveyor and the builders, and the alleged custom relied on by plaintiffs was not proved, and even if such a custom had been proved, it would probably have been held by the Court to be unreasonable and bad, in accordance with the decision in "*Bradburn v. Foley*." It had been sought to be shown that the defendant in this case, Stone, made a negligent representation to the plaintiffs whereby they suffered damage, and that they were thereby entitled to take action; but they must look at the facts. The real truth was that the defendant was employed by the architect, probably as agent for a building owner, and was neither employed by, nor the agent of, the builder; he took his instructions from the architect and returned the quantities to him. There was no representation to the plaintiffs, and no evidence of merit of reasonable use. In his opinion the appeal ought to be dismissed with costs.—Lord Justice Bowen also concurred. The present action was without precedent. To the claim of the plaintiffs there were two fatal objections. There was no privity of contract between the plaintiffs and the defendant, and therefore no relation between the parties, and the defendant owed no duty to plaintiffs under the circumstances, as such duty could only arise from privity. It had been argued that the appeal would be supported on the ground that the defendant made a misstatement to the architect, knowing that it would be passed on to other persons, and that he was therefore liable for any damage they might sustain, as in "*Peake v. Derry*"; but in considering that case as an authority, it was most important to consider the meaning of the word "statement." It here implied a man's belief or opinion. If a man made such a statement, he either believed it or he did not; in the former case the statement was true—if he did not believe it the statement was fraudulent. The decision in "*Peake v. Derry*" would not therefore apply to such a case as this. A quantity surveyor was, as a matter of course, bound to take reasonable care in taking out quantities. But he made no representation that he had taken such care. He only represented that those were his quantities, therefore no amount of mere negligence on his part, assuming that it was not sufficiently gross to raise a question of fraud, could render him liable to the plaintiffs. Even assuming that a representation so reckless as to be fraudulent would render the quantity surveyor liable to the builder, no such evidence was given at the trial of this case. Appeal accordingly dismissed with costs to the defendants, Mr. Justice Stephen's decision being upheld.

**RIGHT TO LATERAL SUPPORT.**—**CROZIER AND CO. V. ROBINSON AND CLEAVER, AND MARTIN.**—This case was heard at the County Assizes, Belfast, on Monday and Tuesday in last week, before Mr. Justice Holmes. It was an action in which the plaintiffs, Messrs. Crozier and Co., claimed from the defendants, Messrs. Robinson and Cleaver, and Messrs. H. and J. Martin, builders and contractors, £7,000 damages for trespass to the house and premises of the plaintiffs, situate in Donegall-place, Belfast, and for un-

lawfully depriving the plaintiffs in the said house and premises of the support to which they were entitled from the soil and premises of the defendants, and negligently digging, excavating, and driving piles close to the plaintiffs' said house and premises, whereby the same were deprived of support and greatly damaged. The plaintiff, James McLees, sole member of the firm of Crozier and Co., gave evidence as to the damage sustained through the rebuilding next door of Messrs. Cleaver's premises, and Mr. W. J. Fennell, architect, supported his testimony, and deposed that it would cost £1,558 to put plaintiffs' house into as good a state as before the new buildings were commenced. Mr. Chas. Cheevers, civil engineer, corroborated, as did Mr. Robert Watt, C.E., Mr. Walter Doolan, architect, and Messrs. Fitzpatrick, Corry, Laird, and John Smith, builders, of Belfast. For the defence it was contended that all reasonable care was taken, and that plaintiff's walls were old and shaky. John Martin, one of the defendants in this action, and a builder and contractor, gave evidence in support of this contention, but in the result the jury found for the plaintiffs, £750 damages. His lordship gave judgment accordingly.

## PARLIAMENTARY NOTES.

**A GARDEN AT THE LAW COURTS.**—Lord Henniker, in reply to Lord Meath on Monday, stated that a sum had been placed at the disposal of the Board of Works for the purpose of defraying the expense of laying out as a public garden the open space adjoining the Law Courts, and that the work would be proceeded with forthwith. The site would within a certain time be probably wanted for an extension of the Law Courts. The First Commissioner of Works had allowed the ground to be put in order temporarily, reserving the power to take away the whole or any part of the ground at any time when required for public purposes. The plan to be adopted in laying out the ground was the design originally made by the late Mr. G. E. Street.

## WATER SUPPLY AND SANITARY MATTERS.

**CREDITON.**—Mr. Smith, C.E., Local Government Board Inspector, resumed on Friday an inquiry as to the water supply of Crediton, and to consider the application made to borrow the sum of £10,000 to carry it out. Mr. H. Oke Smith, accompanied by Mr. Appleton, C.E., attended to support the Watson scheme, which has received the approval of the Commissioners, whilst Mr. Sparks, with Mr. Martin, C.E., was present to advocate the claims of the Four Mills scheme. Evidence in support of the Watson scheme was given by Mr. Moon, surveyor; Mr. W. Lane, of Grattons; and Mr. Richard Sanders, of Exeter, retired engineer; and also by Mr. Appleton. Mr. Martin, C.E., then produced plans and specifications, with estimated cost of the Four Mills scheme, and evidence was given in its favour.

## CHIPS.

At Friday's meeting of the Metropolitan Board of Works the General Purposes Committee reported that the committee had authorised the architect, as a temporary measure, to call in the assistance of any one of the following advisers in cases of valuation in which it may be necessary:—Mr. R. Vigers, Mr. Christopher Oakley, Mr. A. Garrard, Mr. S. Walker, and Mr. J. W. Penfold. On the motion of Mr. Selway, the Board added, "And others whose names may from time to time be reported to the Board."

The parish church of Somerton, near Banbury, is about to be restored, from the designs of Mr. J. D. Sedding.

The whole of the lightning-conductor system at the Whittingham County Asylum, Preston, is being extended, and new earth-plates inserted to insure a more perfect termination; also twenty new lightning conductors are being erected for the further protection of this extensive establishment. The registered system of Mr. Jos. Blackburn, of Nottingham, has been adopted, and the work is now being carried out by that firm.

A large Cambridge quarter clock, showing the time on four external illuminated dials, 6ft. 6in. each in diameter, with over 2½ tons of bell metal, has just been erected at the new premises of Messrs. Beecham and Son, St. Helen's, Lancs, by Wm. Potts and Sons, clock manufacturers, of Guildford-street, Leeds, who are now erecting a new illuminated striking clock at Birkdale Town Hall, Lancs, and just completed a public clock at Middleton-on-the-Wold Church, near Hull, which is situated on the new railway to Bridlington, where there will be a station. The above firm are also making new chimes for the parish church at Leeds.



# Our Office Table.

By the sudden death of Mr. Frank Holl, R.A., at the early age of 43 years, on Tuesday last, the greatest portrait painter of the day has passed away. His portraits, full of masculine character and expression, have been a noteworthy feature of the last eight or nine Academy Exhibitions, and have included many of the most eminent of his contemporaries. The son of the engraver, Francis Holl, A.R.A., who died in 1884, Frank Holl entered the Academy schools at the age of fifteen, and gained a silver medal two years later, and the gold medal and a scholarship in the following year, 1863. Five years afterwards he won the two years' travelling studentship, and devoted himself to *genre* pictures of a pathetic and sombre type, the first to be hung at the Academy being entitled "The Lord giveth and the Lord taketh away." In 1878 he was elected an Associate Academician, and soon afterwards, inspired by the success of his portrait of Samuel Cousins, the engraver, he decided to devote himself to portraiture. In 1883 he was elected an Academician, and since then has frequently, as this year, contributed his full quota of eight portraits to the exhibition. The best of this year is undoubtedly that of Earl Spencer, No. 221, that of Sir William Jenner, No. 228, which hangs near by, being a good second. In 1885 Mr. Holl painted for the Royal Institute of British Architects a portrait of the late Sir Horace Jones, the retiring president. His last work is a portrait of Mr. Cornelius Vanderbilt. Mr. Holl's house, the Three Gables, Hampstead, where he died, was the subject of a double-page illustration, from Mr. Norman Shaw's drawing, in the BUILDING NEWS for Sept. 8, 1882, being No. 19 of our Artists' Homes series.

On the 28th ult. a marriage was celebrated at St. Saviour's Church, Warwick-road, between Mr. Edgar Farman, hon. sec. to the Society of Architects, and Miss Adelaide Hammond, eldest daughter of Mr. G. W. Hammond, R.A.M. Amongst the numerous guests who sent presents were Princess Colonna, the Countess de Labaume, the Countess Telfner, Mrs. Mackay, Mrs. Hungerford, Rev. S. Farman, M.A., and Signor Arditi. The architects we noticed in the church, among others, were Mr. W. H. Seth-Smith, P.S.A., Mr. H. Roumieu Gough, F.R.I.B.A., Mr. B. Tabberer, F.R.I.B.A., Mr. Romaine Walker, Mr. G. A. T. Middleton, A.R.I.B.A., Mr. T. Richards, M.S.A., &c., &c. The Registration Act Committee took advantage of the occasion to present Mr. Farman with a magnificent Louis Quatorze clock in recognition of his arduous work in connection with the objects of the committee.

MR. O. V. MORGAN, M.P., writes suggesting that the Albert Palace, now unused, empty, and in the official receiver's hands, might well be utilised as a technical institute for Battersea. The building is, in Mr. Morgan's opinion, specially adapted for such an institution. The whole place is in splendid order, and very little would require to be done to fit up classrooms, gymnasiums, &c. The extensive grounds which form part of the property are well adapted to recreative purposes, and he makes an appeal to the Charity Commissioners and to the committee of the South London Polytechnic Institute to see whether they cannot find means to adopt this building as one of the three centres.

A MEETING of Masters of Schools of Art was held on Wednesday and (by adjournment) on Thursday week, in the Lecture Theatre of the South Kensington Museum, to form an association representative of their interests and of the interests of art education. About sixty gentlemen attended from all parts of the kingdom, and a society was established to be called the Society of Art Masters. Mr. Edw. R. Taylor, of Birmingham, was appointed chairman for the ensuing year; Mr. Alex. Fisher, of Brighton, vice-chairman; and Mr. Francis Ford, secretary. Membership is limited to the holders of an Art Master's certificate (third grade) from the Department of Science and Art.

The Devonshire Association held its 27th annual meeting at Exeter on Tuesday and Wednesday in last week. The Dean (Dr. Cowie) presided, and delivered an inaugural address on the first day, having as its subject the progress

of science and literature. On the second day an inspection was made of the principal features of the city, and numerous papers were read, including one on "Science and Art in Devonshire Villages," contributed by Mr. J. Phillips, and another by Canon Brownlow on "Christmas with Bishop Grandison," a sketch of the condition of Exeter and its cathedral in 1368.

A COLLECTION of excellent specimens of works by the older water-colourists, and a whole series of the seventy-one mezzotint etchings of Turner's "Liber Studiorum," most of them first states, have been presented to the Art Gallery of Oldham by Mr. Charles E. Lees, of Werneth Park, and are now on view, the exhibition having been permanently opened to the public on Monday. The water-colours include seven pencil drawings on brown or grey paper by Samuel Prout (views in Venice, Milan, and Lisieux), two Yorkshire Abbeys by Thomas Girtin, two by J. Sells Cotman, of Norwich, and examples of De Wint, Copley Fielding, David Cox, John Martin, eight pencil sketches by Constable, and three early architectural studies by Turner.

ARRANGEMENTS have just been completed between the Birmingham School Board and the Museum and School of Art Committee of the Town Council for the supervision by the committee of the teaching of drawing in all the boys' departments of the Board Schools within the borough, and for the actual instruction in art subjects, at the Central Municipal School of Art in Margaret-street, by officers of that school, of the male pupil and candidate pupil teachers under the Board. In consideration of the annual payment by the School Board of £300, the Museum and School of Art Committee have undertaken the performance by officials of the school of these duties. The head master of the Municipal School of Art (Mr. Edward R. Taylor) will also give, at the beginning of the coming session, to all the masters of the Board Schools, an address, illustrated by diagrams, on the methods of teaching drawing. Not the least useful outcome of the scheme will be that after leaving a day school, and on joining classes connected with the Municipal School of Art, a boy will have already mastered many preliminary difficulties, and will also be able to continue his art studies in the evenings on the same system as will now be pursued in the day schools.

THE thirty-seventh annual meeting of the Birkbeck Building Society was held on July 26th. The report adopted unanimously by the meeting states that the receipts during the year ending 31st March last amounted to £9,394,559, making a total from the commencement of the society of upwards of one hundred millions (£109,698,081). The deposits during the past year were £7,170,342, and the subscriptions £182,989, while the gross profits amounted to £177,155. The surplus funds have been augmented to the extent of £377,255, and are now upwards of four millions (£4,051,899), nearly two millions (£1,830,133) being invested in British Government Indian and Colonial Securities, of which nearly one million and a half (£1,466,930) is registered in the books of the governor and company of the Bank of England, £1,434,800 of which consists of Consols and other securities guaranteed by the British Government, being an increase on the year of £35,992. In addition to the above there is a balance in the hands of the bankers of £341,846. The balance profit in excess of liabilities is £222,214. The twelfth triennial bonus (amounting to £23,713) has been allotted to the shareholders during the year. In addition to which, £15,000 have been added to the Permanent Guarantee Fund, which now stands at £125,000, the whole being invested in Consols. The subscriptions and deposits withdrawable on demand amount to £4,374,469. The surplus funds (which are invested in convertible securities) are sufficient to pay the depositors 105½ per cent. There are 49,763 shareholders and depositors.

There has been placed in the transept of the new parish church at Moffat, N.B., a stained-glass window, in memory of the Rev. Alexander Johnston (1765-1851). The subject represented is Christ's charge to Peter—"Feed my Sheep" (John xxi). It has been designed by the architect of the church, Mr. Starforth, and carried out by Messrs. Ballantyne and Son, Edinburgh.

## CHIPS.

On Tuesday the Archdeacon of Winchester laid the foundation-stone of a new mission building, in St. Bartholomew's parish, Southsea. The plans have been prepared by Mr. J. Henry Ball, of Southsea, and the building contract has been undertaken by Mr. D. W. Lewis, of the same town. The building will accommodate 400 worshippers, in addition to the choir, and the chancel can be shut off from the body of the hall when the latter is required for use for secular purposes. In addition a vestry, a classroom, and kitchen are to be provided.

On Saturday memorial stones of new Sunday schools for the Wesleyan denomination worshipping at Gee Cross, Hyde, Lancs, were laid. The estimated cost of the building is £1,370; and the architect, Mr. G. Gill, of Ashton-under-Lyne.

A Jubilee memorial fountain was formally opened at Dalbeattie, N.B., on Saturday. The fountain, which is the work of the Messrs. Newall, Dalbeattie, is composed of three kinds of granite—Dalbeattie, red Peterhead, and Westerly (American). It stands 20ft. high on a platform 10ft. by 8ft.

The corner-stone of Roseash Church, which is about to be rebuilt from plans by Messrs. J. P. St. Aubyn and Wadling, of the Inner Temple, London, was laid with ceremony on behalf of the Mark Master Masons of Devon on Monday week. The work will include new walls, roof, windows, and flooring to nave, which is in an unsafe condition. Mr. J. Clotworthy, of Witheridge, is the builder, and the estimated outlay is £1,500.

A new grammar-school, erected at a cost of £10,000 from the Frances Ashton's Fund, was opened at Dunstable on Monday by Mr. Muddella, M.P.

The summer meeting of the Institution of Permanent Way Inspectors was held at Bristol on Saturday, under the presidency of Mr. A. Ross, of Manchester, who delivered an address on "Internal Communication from the Earliest Times to the Present Day." A visit was paid to the Severn Tunnel.

The memorial stone of a new school church was laid at Lower Penn, Staffs, on Thursday, the 26th ult. The building will accommodate 100 persons. It will consist of a nave and chancel, with a lock-up vestry screened off. The walls will be of stone, with Gothic windows filled in with cathedral-tinted glass. The builder is Mr. H. Lovatt, and the architect is Mr. T. H. Fleeming, whose estimate of the cost is about £550.

Lord Lothian unveiled on Saturday, in the Elder Park, Govan, near Glasgow, the statue of John Elder, the famous shipbuilder. The monument is a gift from Mrs. Elder, and is the work of Mr. E. J. Boehm, R.A. It is in bronze, and over 10ft. in height. The cost has been £2,000.

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TENDERS.

Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

BATTERSEA, S.W.—For the erection of a school to provide accommodation for 800 children and also a pupil teacher's school on the site, in Lavender-hill, for the London School Board:—

Kirk Bros. ... ..	£20,235	0	0
Hart, S. ... ..	19,700	0	0
Holloway, H. L. ... ..	19,552	0	0
Wall, C. ... ..	18,212	0	0
Jerrard, S. J. ... ..	17,935	0	0
Stimpson and Co. ... ..	17,680	0	0
Johnson, W. ... ..	17,493	0	0
Holloway, J., Lavender-hill*	17,000	0	0

\* Recommended for acceptance.

[(a) Cost of school buildings only (including closets) and pupil teachers' school, £13,700; (b) playground, and drainage £354; (c) boundary walls and gates, £920; (d) covered playgrounds, £196; (e) teachers' rooms, £500; (f) schoolkeeper's house and coker's centre, £1,000; (g) for fittings to laboratory, 330; total, £17,000. Total cost per head (exclusive of pupil teachers' school) £16 2s. 6d.]

BRISTOL.—For Ashton Gate Board Schools, Bristol. Messrs. Hansom and Bond, architects. Quantities supplied:—

	A.	B.
Forse, H. A. ... ..	£3,761	£250
Church, W. ... ..	3,717	267
Stephens and Bastow ... ..	3,630	232
Cowlin, W. H., and Son ... ..	3,573	234
Eastbrook and Sons ... ..	3,519	198
Humphries, G. ... ..	3,490	243
Perrott, J. ... ..	3,393	217
Lewis, T. R. ... ..	3,379	185
Wilkins, J., and Son ... ..	3,370	230
Beaver, A. J. ... ..	3,370	205
Rositer, H. ... ..	3,300	167
King, C. J., and Son, Bitton ... ..	3,455	193
Warrington, R., Fil ponds ... ..	2,334	180
A.—For school buildings. B.—For boundary walls, levelling site, &c. Rest of Bristol.		

CHESHAM, BUCKS.—For rebuilding the Prince of Wales, for Messrs. Salter and Co., of Rickmansworth. Mr. C. S. Ayres, Watford, architect:—

Brown and Sons, Harefield ... ..	£763	15	0
Bates, J., Chorley Wood ... ..	749	10	0
Dove, H. M., Watford ... ..	730	0	0
Turner, T., Ltd., Watford ... ..	634	0	0
Darlington, G., Amersham ... ..	630	0	0
Mead, H., Chesham ... ..	559	0	0
Boughton, W., Chesham ... ..	556	0	0

CHESHAM, BUCKS.—For rebuilding The Cock for Messrs. Salter and Co., of Rickmansworth. Mr. C. S. Ayres, of Watford, architect:—

Mead, H., Chesham ... ..	£817	8	0
Dove, H. M., Watford ... ..	795	0	0
Bates, J., Chorley Wood ... ..	778	17	0
Darlington, G., Amersham ... ..	760	0	0
Rance Bros., Luton ... ..	735	0	0
Brown and Sons, Harefield ... ..	725	0	0
Boughton, W., Chesham ... ..	710	0	0
Turner, T., Ltd., Watford ... ..	699	0	0

DERBY.—For Wesleyan Schools, Greenhill, Derby. Mr. J. Wills, Derby, architect:—

Wag ... ..	£815	0	0
Kelham ... ..	780	0	0
Vernon (accepted) ... ..	753	0	0

DUMFRIES.—For supplying patent movable partitions for St. Mary's Mission Hall:—

Stones, J., Ure Mills, Ulverston (accepted).

EDINBURGH.—For works of fencing at Glencarse, for the Edinburgh and District Water Trust:—

Noble, J. (accepted).

HEMINGFIELD.—For patent self-coiling revolving shutters for new stores, for the Barnsley British Co-operative Society:—

Stones, J., Ure Mills, Ulverston (accepted).

HEMEL HEMPSTEAD, HERTS.—For the re-erection of the Bury Mill, for Mr. R. Mead. Mr. W. H. Syme, A.R.I.B.A., architect:—

Judge and Bames, Watford ... ..	£1,624	0	0
Waterman, G. and J., Watford ... ..	1,417	0	0
Smith, S. C., Hemel Hempstead ... ..	1,340	0	0
Andrews and Sons, Watford ... ..	1,335	0	0
Payne, J., Hemel Hempstead ... ..	1,335	0	0
Turner, T., Ltd., Watford ... ..	1,244	0	0
Sear, W., Hemel Hempstead* ... ..	1,220	10	0

\* Accepted.

LONDON.—For altering covered way and enlarging Baker-street Station, for the Metropolitan Railway Co. Mr. R. P. Seaton, C.E., engineer. Quantities supplied by Mr. A. R. Brede, 58, Theobald's road, W.C., surveyor:—

Firbank Bros. (accepted) ... .. £9,300 0 0

LONDON.—For block of offices, Cloak-lane, London.

Mr. T. Tayler Smith, architect:—

Stephens, Bastow, and Co. (accepted).

LONDON.—For new hotel, Albemarle-street. Messrs. Ernest George and Peto, architects. Quantities supplied by Messrs. Stoner and Sons:—

Stephens, Bastow, and Co. (accepted).

LONDON, E.C.—For the supply of hydraulic machinery for working the Tower Bridge, for the City Corporation:—

Armstrong, Mitchell and Co. (accepted) ... .. £85,232 0 0

MILE END.—For the erection of 24 small houses in Hobson's-place, Hobson's-court, and Pelham-street, Mile End, New Town, E. Mr. J. Hudson, 80, Leman-street, E., architect:—

Loveday, J. ... ..	£7,570	0	0
Calnan, M., and Co. ... ..	7,391	0	0
Hearle, J., and Son ... ..	7,284	0	0
Wood, F. and F. J. ... ..	7,063	0	0
Roberts, C. F. ... ..	7,026	0	0
Hammond, J. S., and Son ... ..	6,977	0	0
Bentley, J. ... ..	6,976	0	0
Outkwaite, J., and Son ... ..	6,903	0	0
Little, T. ... ..	6,819	0	0
Norton, T., and Son ... ..	6,803	0	0
Catmur, W. ... ..	6,690	0	0
Wells, H. ... ..	6,620	0	0
Cocks, J., and H. ... ..	6,594	0	0
Sparks, J. ... ..	6,500	0	0
Harris and Wardrop ... ..	6,493	0	0
Cousell Bros. ... ..	6,720	0	0
Gladding, W. (accepted) ... ..	5,587	0	0

PRESTON.—For erection of weaving shed at Ribchester near Preston, for the Ribchester Co-operative Cotton Manufacturing Co. Ltd. Mr. J. Bertwistle, F.R.I., Blackburn, architect. Quantities by the architect:—

(Accepted tenders.)

Ironwork—Engine, boiler, shafting, pillars, and gutters:—

Yates, W. and J., Blackburn ... .. £2,342 0 0

Masons:—

Kay and Finder, Longridge ... .. 1,659 13 0

Joiners:—

Lloyd and Millward, Darwen ... .. 777 0 0

Flagging and slating:—

Dean, J., and Co., Blackburn ... .. 882 0 0

Plumbing and glazing:—

Shaw, J., Blackburn ... .. 120 0 0

Plastering and painting:—

Fletcher, L., and Sons, Ribchester ... .. 195 8 0

ROMFORD.—For erecting covered yard and stabling at rear of the Woolpack Inn, Romford, Essex, for Messrs. Ind, Coop., and Co., Ltd. Mr. J. Hudson, 80, Leman-street, E., architect:—

Bentley, J., Waltham Abbey ... .. £889 0 0

Hammond, J. S., and Son, Romford ... .. 897 0 0

Gladding, W., Whitechapel\* ... .. 754 0 0

\* Accepted.

SOMERSET.—For alterations and additions at Durley Hill, Keynsham. Mr. H. Phelps Drew, 99, Gloucester-road, London, S.W., architect:—

Bastow, Bristol ... .. £1,333 0 0

Lewis, Bristol\* ... .. 1,308 0 0

\* Accepted subject to revision.

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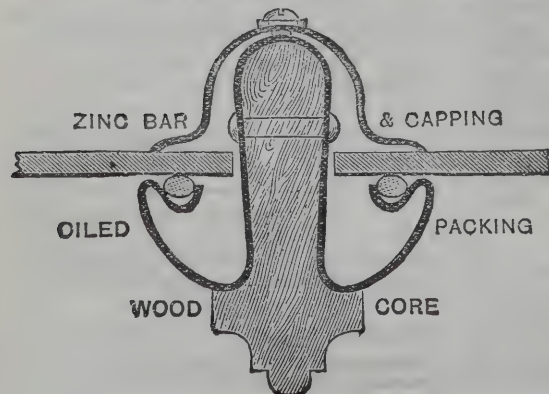
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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1753.

FRIDAY, AUGUST 10, 1888.

## ARCHITECTS' PARTIAL SERVICES.

[THERE is a class of employers who are anxious to obtain professional assistance, but who are less willing to pay the commission. They seek to obtain advice and fill at the least cost. We cannot blame the individual for trying to do what all of our kindred means are in the habit of doing—getting their commodities in the cheapest market, or on the easiest terms. On the whole, this sort of people are wiser than those who entirely dispense with professional aid, and who often find out their mistake. Skill and experience are worth buying, for a man cannot become his own doctor or lawyer, nor an architect without finding out his own shortcomings—without, in short, having a fool for his client." Thus, it is wiser for a man to obtain a design for a building than to proceed to build without a plan, or upon one of his own designing, as a great many are silly enough to do, and if he can get a good set of plans prepared at a small cost, he does not blame him. A by no means uncommon mode of setting about building is for an employer to go to an architect, and ask him to prepare a design or set of plans, and then to commence building operations by employing his own builder or workmen, dispensing with the services of the architect. The contract drawings are all made, specifications, and, it may be, quantities prepared, and builders are invited to send in tenders. These are found too high, and the owner makes certain alterations and determines to build without the architect's further help. He sees a builder, who promises to carry out the plan for a considerable reduction by making certain alterations, who suggests that the cost will be less if the work is solely intrusted to him. There are many too willing to jump at such an offer. They do not perceive how easy it is to reduce the quality and quantity of the materials; what a difference "second" quality bricks or inferior stone can make to the cost, how the alteration of a feature here or the omission of another there can diminish the cost and at the same time seriously injure the design. The bait takes, the plans are remodelled, and the work is commenced. The architect is quietly shelved; he sees the work commenced, and immediately sends in his claim for preparing plans and specifications. The account is disputed, the employer says he has not made use of the plans, and the architect has to sue to obtain his commission.

A more artful mode of proceeding is the following:—An architect is instructed to prepare the necessary plans and specifications. These are accepted, but not finally approved. The matter remains in abeyance for some time. The owner takes advantage of the delay he has procured. The plans are submitted to friends who make suggestions, the owner sees other buildings, his object being to obtain all the hints he can. A very usual course is to affect that he does not intend to build directly. The architect waits. A few months, or it may be a year or more elapse, when the architect finds to his astonishment that the building has been commenced, but that he has not been further consulted. The owner has put his plans into the hands of a builder to carry out. Anger and disappointment seize the architect, he sends in his account for preparing plans; the evasive reply comes that the original design was of no value—it is returned; in some cases a request to render an account for services is

sent, after which the owner begins to build. In either case the services have been of use, the architect is the sufferer. Though sundry modifications may have been made, ideas have been appropriated. It is astonishing how some people will persuade themselves that an idea is theirs that they never heard of or saw before till someone happened to mention it or show it to them, and the ideas of an architect are everything. A plan, for instance, may be modified, but still the idea of the designer is taken with the modification. One glance at a design may be enough for a clever crib to take all that there is valuable in it, so a man may deny *in toto* that he has used any of an architect's design, and all the while he may have benefited immensely by the study of the drawings. In short, the owner may have robbed the brains of the architect and yet deny his liability to him. For the good of the profession there should be a law to compel a man, after approving of the design, to adopt it, or, if not carried out, to enable the architect to charge for his skill on an adequate scale. As the two parts of an architect's work are separable—design and superintendence, injustice is frequently done by persons paying for the greater half of the work at half-price. The profession have to blame themselves for permitting the notion to be entertained that architecture can be copied at liberty, or that the art may only exist on paper, and become a trade of selling and buying plans. The public have been taught to believe that plans can be bought anywhere, that there is no thought or labour in making them. Books of designs abound, and one's original idea in plan or design may be very like another's—so much so, indeed, that it would be hard for one to say which design claimed priority in point of merit. The same idea of arrangement or combination may strike more than one mind. We have indeed seen plans so much alike that it would be hard to assert that one of them was not a copy of the other. Published books of designs have been instrumental in multiplying the same design, and have done the profession more harm than good. Our readers will pardon this digression, the purport of which is to show that the profession, by making their designs too cheap and overflooding the market with stock plans, have injured themselves in the eyes of the public.

A correspondent the other day brought before us the circumstances of a case very similar to those we have pointed out. An architect agrees with the building owner to furnish plans, specifications, and superintendence at a certain percentage, and quantities at an additional percentage. The owner employs his own men or contractors to carry out the different trades, but does not consult the architect; the charge for quantities is disputed, and the works are underlet to different tradesmen with the object, it is alleged, of saving the architect's commission. There appears to have been a clear contract here in which the architect agreed for a certain sum to carry out the whole work. The design was, it seems, not prepared on approval; but instructions were given to do all that was necessary, and therefore the architect is legally entitled to his commission. If the building owner did not accept a tender, it is not the fault of the architect who, acting as an agent, has a perfect right to obtain quantities, and he is therefore entitled to claim for them. The custom of the profession is that, until a tender is accepted, the owner is liable for the quantities; but if a tender is taken, the owner's liability shifts to the contractor. The surveyor then looks to the contractor. The custom is at least a fair one; if the owner alters his mind by reason of the tenders being too high or other reasons, it does not appear just that the surveyor or the architect who procured the quantities should be the

loser. The quantity surveyor is in a different position to the architect; if the tendering is higher than the client was led to suppose, it is no fault of the surveyor, who is engaged solely to take off the items of material and labour in the architect's design, and therefore is entitled to receive his fees. The architect's claim for his work can only be set aside reasonably, when the cost so far exceeds the estimated amount that the owner is justified in contending the contract between himself and his architect is broken. And there is need of some understanding of this kind: an owner cannot expect that an architect's estimate can be always within a small sum of the actual cost, and a certain margin is justified; on the other hand, the architect must be reasonable, and ought not to expect a client of moderate means to fulfil an engagement when the cost is perhaps double that which he was given to expect it would be. If parties would only agree at the onset in writing, all doubt would be set at rest; but instead of doing so, custom is appealed to, and a jury would naturally ask whether the custom is a reasonable one. An architect can always if he chooses decide upon what terms he will undertake to prepare plans and specifications, what he is to be paid if the owner abandons his intention, or does not engage him to superintend the work. An immense amount of trouble and litigation would be saved by so agreeing. In the schedule of charges proposed by the Western Association of Architects of America the charges for partial services are as follows:—preliminary charges, 1 per cent.; such work including general drawings and specifications, 2½ per cent.; including details, 3½ per cent. The latter percentage is certainly not too much, as these preliminary services include the higher functions of the architect's duty; the client obtains the benefit of that work, and can use it hereafter, as we have seen he often does, to the prejudice of the architect. At the present moment there is nothing to prevent an individual obtaining an architect's design surreptitiously, afterwards pleading that the cost is too much, or that the design is unsuitable. Hundreds of architects are willing to furnish designs on approval, and it is this class who are liable to be imposed on by unprincipled clients. The only understanding is that if the plans are approved, and the work is commenced, the architect will be engaged to carry out the building. But architects of this confiding disposition find that their designs are seldom approved. Why should they be, if the owner can obtain all he wants, and carry out the design at a percentage less in cost? The one remedy open to them is to resolutely refuse transactions of this kind, which have the tendency to lower the architect's services, and to place them on the same footing as goods submitted on approbation. So long as there are members willing to buy commissions on these terms, the public will be inclined to undervalue the services of the architect, and to imagine that it is open to them to decline paying for professional skill just as well as they can refuse to purchase an article of which they did not approve.

## LAND SURVEYING.—IV.

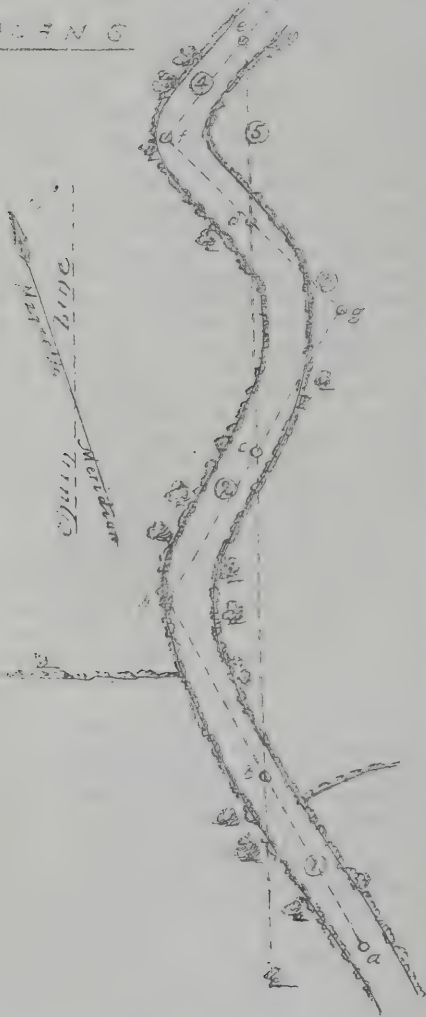
PLOTING.—ROAD SURVEYS.—TAKING ANGLES.

FROM the field-book of the last example (p. 100) it should not be difficult for the learner to plot the whole of the river survey to a scale of, say, 3 or 4 chains to the inch. Having drawn in its proper direction, the main chain line is laid down by the aid of a scale or beam compass pointing off the intermediate stations where the sides of the triangles meet the base-line. Construct the largest triangles by the beam compass made by lines 3, 4, 5, and 6. To do this, take the



distance in field-book of line 4, 610 links, and applying the point to station on base-line, describe an arc with the pencil point after it has been carefully adjusted to the length. Then from the next station, where line 3 crosses base-line, take the distance between 160 and 480 links = 320, and cross the arc by another arc; the large triangle can then be completed. In the same way lines 5 and 6 can be set out, taking care to obtain the distances in the field-book, transferring them to the scale on the beam compass. For the purpose of nice measurement the compass is provided with two beam heads which slide along the bar, and a clamping screw attached to one of the heads will fix it at any desired distance from the point. The beam head at the end of bar has a fine adjustment which moves the point a very small distance to correct any slight error

PLAN 6



in the first setting. If the intersection of triangles in the bend of river corresponds by scale exactly to the field-book, the construction may be assumed to be correct; if not, the process must be carefully repeated. If the error is again found, the chaining has been incorrectly entered, or an error in transferring the distance to the scale has been made. The other lines, 7, 8, and 9, forming the secondary triangle is set out in the same way, and when all the lines are plotted they are carefully checked by the scale from one station to the other, to see whether they agree with the entries of field-book. With some surveyors the main lines chained in the day are plotted at night, so that if any discrepancy occurs the lines can be re-chained next day: in this manner the main triangles are set out before the details are completed. Time is thereby saved, and accuracy insured.

We give an example here of a road survey by a chain only. The diagram (plan 6) needs little explanation. First, the chain line  $b, c, d, e$

is measured, after being poled out, the assumption being that the fields on each side of road can be ranged through, and the chain dragged through the hedges. At  $a, b, h, c, d, f, e$  in the road, stations or poles are fixed, and the lines between them measured, the main base line becoming a check or proof line to the triangles. Stations  $a, b, h, c, d, e$ , on the road are left as the base line is chained, taking care that the three poles  $h, c, g$  are in a line, and for this purpose the poles must be regulated accordingly. The same remark applies to line 3. When the adjoining lands cannot be traversed by a base line, the lines can only be taken along the road, and the angles and the bends measured by the theodolite. For a survey of this kind the field-book is very simple, only showing the bends of the road on one side and the other of the chainage column.

## TAKING ANGLES.

By supplementing chain surveying with the theodolite, many of the difficulties met with, and much of the time spent in chaining the lines, are avoided. The surveyor will not be long in discovering which will insure him the best results—the chain only, or the chain and theodolite. Very often a combined use of the two methods can be employed with very decided advantage. Take, for example, a simple quadrilateral field or inclosure. The sides can be chained, and one or more tie-lines or a diagonal taken; but the same result can be accomplished by chaining the sides and taking two internal angles with an instrument. The angles can be entered in the field-book thus:

From $\odot A$	$82^{\circ} 29'$	to $\odot C$
$\odot B$		From $\odot B$
		$110^{\circ} 26'$
		$\odot C$
		$\odot D$

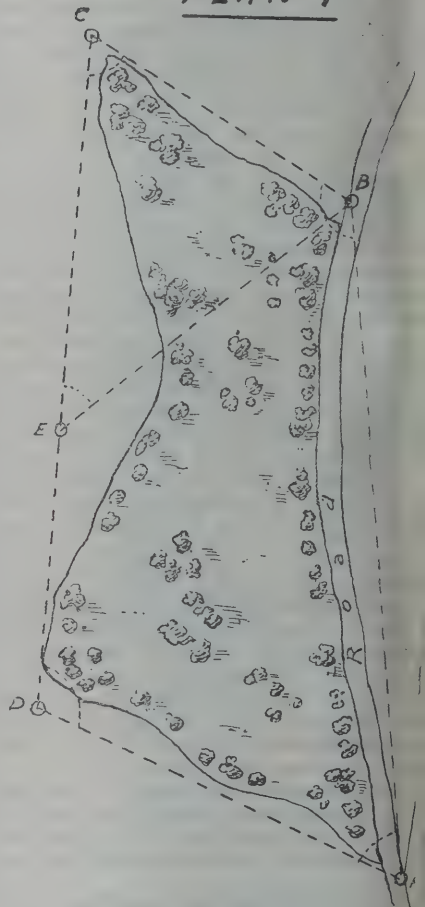
Or they can be shown on a sketch of the fields, a plan preferred by many surveyors as being simpler. To plot the angles the centre of protractor is placed exactly on the station of the base line first drawn, and the zero or 360 in line with it, and prick off from the arc the degrees and minutes as accurately as possible. (The electrum or vulcanite circular protractor sold by Stanley is the best. The degrees can be read either way.) Draw a line through the marked point, and the angle is given. The angular instrument is also used with advantage for continuing base lines obstructed by buildings and water. We have already shown how the line can be continued by erecting perpendiculars on each side of the obstruction (see page 99), or by taking angles with the chain; but these processes are laborious. With a simple box sextant the operation is rendered much easier. Having arrived at the obstruction A (Fig. 6), fix a peg down, set the vernier of sextant to 90, then, standing directly on the point A, look through the hole in box towards a pole put up a little behind on the same line, and direct with the hand the man with flag at  $a$ , which will give the perpendicular. A similar perpendicular is raised at B to  $b$ , and the distance  $a b$  measured as before. In carrying a line over a river the operation is much less tedious than it is with a chain, as we explained page 99. Referring to Fig. 10, a flag is put up at a convenient distance on the bank of river. Erect a perpendicular  $a b$ . At  $b$  place the theodolite, and measure angle  $a b c$ . Clamp lower plate, and turn telescope round, and set it to the same angle, fixing a flag at the point on base line B on the other side of river. Then the distance  $a c$  will equal the distance across  $a B$ . Thus, one turn of the instrument is sufficient to do that which required the measuring of four lines. Other means will suggest themselves to the surveyor, and we shall give one or two examples as we proceed.

In surveying a field with several sides, poles or flags are fixed at the angles or

stations; the sides are then regularly chained and two or more angles taken, those only being selected for instrumental measurement which fix lines. Very obtuse angles are best avoided. One problem in Euclid ought to be kept in mind. In Book I, Prop. 32, it is enunciated that in any rectilinear figure the interior angle and its adjacent exterior angle are together equal to two right angles, therefore all the interior angles, together with all the exterior angles, equal to twice as many right angles as the figure has sides; hence the sum of all the interior angles of a polygon is equal to twice as many right angles as the figure has sides, minus four right angles. Thus, in a 5-sided figure, the sum of all the interior angles is  $5 \times 2 - 4 = 6$  right angles, and  $6 \times 90 = 540$ .

As we have said, it is not always possible to run through lines or diagonals to fix angles. Let us take the case of an enclosure like a wood or an area walled or fenced in: external lines only can be measured, and it becomes necessary to take the angles between

PLAN 7



chain lines. We give an example of a wood where diagonals, or "tie" lines as they are called, cannot be taken in the ordinary way of ranging. A B, the base-line, is first chained and entered in the field-book, and poles fixed at all the corners of the wood, A B C. Having arrived at station B, the angle A B C is taken. The instrument is placed on station B, the zeros of the horizontal plate are clamped, and the object glass of the telescope turned to the pole at A; the whole instrument is then clamped and the upper one unclamped. The telescope is then directed to pole C, and the angle is read. Line B C is next chained and the instrument set on C; the angle B C D is taken. The C D is chained, and the angle D taken with the instrument. D A is measured and the angle C D A taken. As there are four right angles and  $4 \times 90^{\circ} = 360^{\circ}$ , the angles measured added together must equal that number, and



this is a proof of the correctness of the angles taken. Of course, it is not necessary to take all the four angles; two angles on the base line or opposite angles will be found sufficient if accurately taken.

One word as to chain scales may be useful here. Those in general use are according to the number of divisions to the inch—thus there are 10, 20, 30, 40, or more divisions to the inch; the 10 scale would be used as a scale of one chain to the inch, the 20 for two chains to the inch, and so on. The chain scale should have on one of the edges a feet scale, or 66 divisions on one side correspond with the 100 divisions or links on the other. The plotter can then use either side, dimensions in feet can be taken off from a plan plotted by the chain, or feet can be converted into links.

#### ARCHITECTURAL ASSOCIATION EXCURSION, 1888.

[WITH PHOTOGRAPHIC ILLUSTRATIONS.]

ON Monday next the annual excursion party of the Architectural Association will commence its programme, starting from Matlock Bath, where the headquarters will be located. The places to be visited include Derby, Longford (where there are some notable tombs), Marston - Montgomery, Somershall-Herbert, Sudbury Hall (an excellent specimen of the Domestic architecture of the 17th century in red brick), Hilton, and Etwell. Wingfield Manor, Hardwick Hall, Bolsover Castle, Haddon Hall, and Wollaton are the chief buildings to be seen during the week, and Ashbourne and Bakewell furnish the principal churches. Chesterfield, Tissington, Norbury where there is some good stained glass and a manor house, Bradbourne Church, Brassington, Youlgrove, and Nottingham make up the list with those previously mentioned. Without anticipating the proceedings, we have to-day, with this preparatory notice, printed some excellent views of two of the most interesting specimens of Derbyshire architecture arranged to be seen on the present occasion, and next week other photographic illustrations will accompany our report of the excursion. The photographic plate herewith is composed of five reproductions from two silver prints of Wingfield Manor and one of Ashbourne Church, by Mr. Richard Keene, the well-known photographer at Derby. Of Wingfield Manor the following particulars concerning its history are of importance, and especially is this so, because the buildings now standing form but a very incomplete and fragmentary portion of those which once were included within the outside walls of this great mansion, which was then known as Winfield, though enough exists to indicate its original dimensions. Mr. Edmund B. Ferrey, F.S.A., in his useful and fully-illustrated folio monograph of the place, privately published in 1870, presents us with several carefully-arranged facts relative to its historical data and architectural features. The building occupies a commanding site on an eminence surrounded by fine trees, and from the Ambergate Junction and Chesterfield Railway it presents an imposing aspect, boldly rising its elevation over the landscape. The mansion was built by Ralph Lord Cromwell in the reign of Henry VI. It consists of two great courts, the extreme length of the entire enclosure being 416ft., with an average width of 220ft. The great gate-house is in the south-east angle of the outer or south court. On the left is a fine old barn; but the remainder of the south and the whole of the east and west sides have been ruined. One portion of the north side of this court that divides it from the inner court is now used as a farm-house; but only the outer walls of this building are original. The small, upper photograph on the accompanying plate shows this structure on the right hand of the picture. The gateway on the left in the view forms the entrance to the inner quadrangle, and it is fairly perfect. The continuation of the same block is very picturesque, with the great chimneys and high tower still standing to the left, measuring 72ft. to the summit, from whence a splendid view of the courtyard are the remains of the state apartments, which were occupied on two occasions

by Mary Queen of Scots, about whose enforced residence at Wingfield (in 1569 and 1584) several particulars are preserved in the Public Record Office. Sir Ralph Sadler, in a letter written from Sheffield Lodge in August, 1584, tells Sir Francis Walsingham that he had entreated Lord Shrewsbury not to remove the Queen from thence to Winfield till Elizabeth had sent her orders, for he "had rather keep her at Sheffield with 60 men than at Winfield with 300." Many attempts to rescue Mary were made, but failed, and some think her escape was intended by the Earl. The south front of the banqueting hall, with its beautiful oriel bay window and charming porch, furnished the most interesting portion of the existing ruins. The lower view herewith illustrates the entrance, and beyond is seen the gable of the return block of buildings, once occupied by state apartments, with a large hall over them, the traceried window of which is a good example of the style. The external archway to the "Portal" has capitals of peculiar section. In "The History of Winfield," by Thomas Blore, F.S.A. (1793), a view is given of the chamber which existed above the entry. The Haltons spoiled the banqueting hall in the 17th century by dividing it into two stories for dwelling-rooms, and the mullions to the windows of the hall on the north side are of that date. In 1774, another member of the Halton family (the Haltons purchased the estate from the Duke of Norfolk and from the Lord of Shrewsbury) built himself a residence at the bottom of the hill, and pulled down some of the ancient manor house buildings for the sake of its materials. Below the hall is a large groined apartment or undercroft, usually known as "the crypt," but no ecclesiastical associations are connected with it; neither is it altogether underground, owing to the fall of the site. It is thought to have been the retainers' hall. The masonry is rather rough, and nearly all the central row of octagonal shafts and wall piers vary slightly in height, while the vaulting ribs spring in a very irregular way from the abacus. The keystones to the wall arches are rudely carved; but the fan-traceried bosses to the vaulting are very richly detailed. The stone floor has been removed. Some traces remain of the ancient chapel, which was a detached building to the N.E. of the banqueting hall, and was reached by an open cloister or pentice, now gone. Beyond the "state apartments" to the west are the ample kitchen, butteries, &c., with the necessary cellarage. The east wing of the south quadrangle was occupied by the "Guard's Chambers," and above these was another series of rooms, as the two tiers of windows give evidence. The greater portion of the barn is evidently original; but the easternmost bay, which is wider than the others, was added subsequently at a rather later date, though it nearly accords with the remainder. The massive oak roof to this barn is notable. Around the north side and greater part of the east side of the north quad, is a dry moat, in appearance, which was probably made when the stone was quarried for the building of the manor house. Generally speaking, all the stonework is in an admirable state of preservation, and some portions of the moulded work look as if they had only just left the mason's banker, so sharp and well-defined are the arries. Lichen and moss do not thrive, and some years ago the ivy was removed from the walls to preserve them.

Mr. Ferrey further tells us somewhere in his book that the more important parts of the building are faced with ashlar (a crystalline millstone grit), which was probably obtained from Ashover Moor, about four miles distant. In the great irregularity of its walls, Wingfield resembles Haddon and other Mediaeval houses, and when in its prime must have even excelled that beautiful mansion in extent if not in interest. Unfortunately, the place was dismantled in 1646 by order of Parliament, and previously the house had suffered by the Parliamentary siege, Wingfield having been captured by the Royalists in 1643 under the Duke of Newcastle. We gave a sketch of the house by Mr. Langham in the BUILDING NEWS for Sept. 15, 1876.

Turning now to Ashbourne Church, which is situated in a beautiful valley watered by the Schoo or Henmore, a tributary of the Dove, some 15 miles from Derby, we reach a

most interesting building known for its spire as the "Pride of the Peak." William Rufus gave this church to Lincoln Cathedral in 1093; but it was during the present reign transferred to the Bishop of the Diocese. The existing building consists of chancel, nave with south aisle, north and south transepts, each with an eastern aisle, and central tower and spire. The total length internally is 176ft., and the spire is 212ft. high. Besides the eight modern bells there is an ancient sanctus bell at the base of the spire. With the exception of a few moulded stones, no remains of the Norman church exist. Our view shows the church from the west end. The chancel is Early English, and was restored by Sir Gilbert Scott in 1882-3 with the usual result. The remainder of the building, including the spire, is chiefly in the Decorated style of the 14th century, with Perpendicular insertions, and the walls were also raised by the addition of clerestories in the 15th century, when new roofs were put on throughout. The north transept formed the Lady-chapel, and the south one was known as the Bradburne quire. The whole of the ancient fittings have been swept away, except the north transept screen. The church was dedicated to St. Oswald by Hugh de Patishull, Bishop of Coventry, in 1241, as an ancient dedication plate affixed to the south-west pier of the tower records. The monuments are now in the north transept, and are of some interest. The memorial to Penelope, only child of Sir Brooke Boothby, who died in 1791, aged six, by T. Banks, R.A., is highly spoken of, and is executed in Carrara marble. In the main street east of the church stands the Free Grammar School, a fair specimen of plain Elizabethan architecture. In Wickes's "Towers and Spires" that of Ashbourne Church is the only Derbyshire example illustrated (Vol. III. plate 2), and it is the best in the county. The interior of the church is very light, and will well repay a visit.

#### THE METROPOLITAN BOARD OF WORKS INQUIRY.

THE Royal Commission resumed their investigations on Tuesday.

Mr. John T. Bailey, builder, said he was the owner of four plots of land near the White Lion, Putney. In 1884 building plans were submitted by him to the Board, at the same time that plans were submitted by Mr. Silcock, the adjoining owner. This year he learnt that Mr. Silcock had submitted amended plans, which would spoil the elevation, and, in addition, project the building a foot beyond witness's line. He found that these had been approved.

Mr. William G. Silcock said that in his original plan, owing to the fall of the ground, Mr. Bailey's balcony ran into his window, and to obviate that witness's plans were altered.

Lord Herschell said that it seemed somewhat hard, in a case where two persons sent in a joint plan which had been approved, and after one had begun to build, that behind the other man's back the adjacent owner should be allowed to vary his plan to the detriment of his neighbour.

Mr. Thomas Blashill, superintending architect to the Board, said the change in the plans was simply due to a mistake of the original architect.

Mr. M. Staniland said that formerly he was a partner with Mr. Webster, but he had merely a financial interest in the business. With regard to Mr. Beal's statement that while M.P. for Boston he had received £10,000 for being surety for the contractor for the Thames Embankment, in conjunction with Mr. Doulton and Mr. Jackson, he had publicly contradicted the whole of that evidence. He did not receive any money from the contractor, Mr. Furness, whom he did not know, and he had never had any business in common with Mr. Doulton and Mr. Jackson.

Mr. J. R. Jolly stated that he had on several occasions, when the reports of the Building Committee came up, protested against the practice of not stating the reasons why plans were refused.

Mr. George Furness, contractor for the construction of part of the Victoria Embankment, said that the contract enabled him to use the material from the Thames for the purpose of filling in. He received 6d. a load from the persons who deposited the material. There were about 200,000 loads. He received between



£40,000 and £50,000 altogether on the contract. He had paid no money to any officer of the Board. Mr. Doulton provided the sureties on the Embankment, the sureties being Clench and Clellan. Mr. Doulton was not one of the sureties, nor was Mr. Staniland. When contracting he did not know that he would be able to use the Thames material; contractors had to take their chance of such things. As to the Odessa Waterworks, witness said that, on the advice of his agent, he took the contract at something like 15 per cent. less than the amount stated in the concession. He had no agreement with Sir J. Bazalgette on the subject, and did not know that Sir Joseph had anything to do with it. In reply to Mr. Winch, witness said it had been the habit of the Metropolitan Board anterior to witness's contract to call upon the surety to finish the contract; consequently it was very difficult to get anyone to be surety and to give a personal guarantee.

Mr. Meadows White said the Board did not have sureties now. The practice now was to retain certain moneys in the hands of the Board—he thought the amount was five per cent.

Mr. A. de Tatton Egerton, M.P., said that he was a member of the building committee of the Board, but he had not been aware that Mr. Saunders and Mr. Fowler were employed officially in matters which came before the Building Acts Committee with reference to plans. He did not know of their connection with the alterations at the Criterion; but he believed he knew that Mr. Saunders had something to do with the Métropole or one of the other big hotels in Northumberland-avenue.

Mr. Emil Loibl, the former proprietor of the Pavilion, said he was desirous of keeping his premises, which he had built and held for 20 years. He had offered to the Board to pay a rent of £6,000 a year, and to go out at three months' notice. That offer was not accepted, and shortly after he increased his offer to £7,000 a year. They never answered his letter because two members of the Board and Goddard had been promised large sums of money by Mr. Villiers. By Mr. Meadows White: Witness offered to leave the £109,000 awarded him as compensation in the hands of the Board if they would let matters stand, as he did not want to go out. Mr. Villiers paid the same rent that witness offered. In reply to further questions, witness denied that the Board had offered him terms, although he had the £109,000 at his back. It was a "Board of Corruption," and they had done him out of £200,000. Because they could not get anything out of him, they kicked him out of the office.

Mr. A. G. Powell, solicitor for Mr. Loibl in some negotiations, put in a correspondence he had had with the Board, in which Mr. Loibl was warned not to spend a large amount of money in additions to his premises.

Mr. Loibl, recalled, in reply to Mr. Meadows White, said that he was a member of the Music-hall Protection Association. He denied that he had had a correspondence with the solicitor of that Association about the conduct of the Pavilion.

Mr. Meadows White then read Mr. Goddard's report on Mr. Loibl's application for a continuance of his tenancy. The report stated that up to the date of the award the Pavilion had been carried on in a proper manner; but since the character of the entertainment had undergone some change, and there had been a strong correspondence in the *Era* on the subject.

Mr. Hugo Wolheim, chemist, described the proceedings in connection with the Walter process for the purification of sewage, which he had laid before the Board. He complained of obstruction and unfair treatment, and referred particularly to delays and interference with samples. Seals were tampered with, so that certain experiments were of no value, and communications from him were withheld from the knowledge of members, as he conceived, unfairly. There must have been somebody at the Board who made it his business to prevent a fair judging of the results of his experiments.

Mr. E. Rider Cook, the present deputy chairman of the Board, stated that he had been a member for 23 years. He detailed the various steps the Board had taken in connection with the purification of sewage. He considered the Board had taken the best possible means to ascertain how they should deal with London

sewage. What the Board was now doing was in conformity with the recommendations of Lord Bramwell's Commission. He considered that their works at Crossness were the most magnificent sewage works in the world. As to Mr. Wolheim's scheme, the report from that gentleman's own referees showed that it would require ten times more time than the process adopted by the Board, and that it was much more costly. The Board were, therefore, obliged to discard it. The Board gave the fullest scope to the experiments with Mr. Wolheim's scheme. He regretted that one seal had been broken by an injudicious servant. The officer was severely reprimanded, and an expression of regret was sent to Mr. Wolheim. When the Board acquired the site of the Pavilion, and it was decided to continue the music-hall, it was arranged to meet the objections he and others held that a censorship should be exercised over it. Lord Herschell: We now know that the censor was in the pay of the proprietor. Witness said that at the time the question was discussed in a *bonâ fide* way, and the arguments used by those who voted against him were the arguments of honest and upright men. He added that several of the older members of the Board meant to seek election on the new London County Council, and he asked the Commissioners to issue an interim report which would remove certain imputations that had been cast upon them. Lord Herschell said the Commissioners would issue their first report within two or three months.

The Commission then adjourned to Tuesday next, Lord Herschell stating that they hoped then to finish the evidence at present available.

#### THE COLFE GRAMMAR SCHOOL DESIGNS.

THE five selected designs in this competition are on view at the Leathersellers' Hall, St. Helen's-place. No fewer than 163 designs were sent in. The design by Messrs. W. S. Weatherley and Jones has been selected by the committee, subject to the approval of the Charity Commissioners and to the report of Mr. Ewan Christian, F.R.I.B.A. In this design the hall is placed centrally, with the classrooms round it, there being two class-rooms on each side, separated by sliding partitions, a head-master's class-room on one side of the front block, and a laboratory corresponding in size and projection on the other. The hall is 57ft. by 36ft., and is top-lighted by a lantern. The class-rooms are each 22ft. by 20ft. 6in. with large side windows, and dual desks in rows, lighted on left hand; a future extension of class-rooms is shown by a block in the rear. The entrance is central to the Lewisham Hill front, a head-master's room with conveniences being on the left hand, and a common room, lavatories, &c., on the right-hand side. These rooms are convenient, and a good lobby approach is shown to the laboratory and class-rooms in front. A side entrance on the south side gives egress to the playground, a covered ground and gymnasium being shown in the south-east corner of ground. The entrances, with lobbies for hats and caps, are conveniently placed at each side at the end of class-rooms. "Q. E. D." shows a rather different arrangement of front rooms: the porter's and store-rooms are larger. In the elevation the authors have tastefully adapted Elizabethan features; the projecting end gables of front and the centre entrance porch with clock turret over are well managed, and the details have been carefully worked out. The section shows a rather meagre construction of roofs, a wide centre iron roof over hall, with large lantern roof down the centre, and two high-pitched roofs over the class-rooms, iron being largely used in the stanchions and roofs; air flues are shown in the breasts of chimneys in class-rooms.

Messrs. John Giles, Gough, and Trollope send a cleverly-drawn set of elevations quietly treated in a brick version of 17th-century English architecture with Late Gothic details. The great hall is central, 74ft. by 32ft. There are three classrooms on one side, and two on the other, with entrance between, leading by a covered way to a laboratory and block of lavatories. The front block, which is kept low, contains a central entrance and hall, head and assistant masters' rooms, and book-store. Over the low roof of this block is seen the

gabled end of great hall. The classrooms have low, flat roofs; clerestory windows over them light the great hall. Revolving shutters between the classrooms are shown, with coils for heating and Tobin's inlet tubes.

Messrs. Clark and Moscrop, architects, Darlington, have also a well thought-out plan. The hall is central and placed lengthwise, having three corridors round three sides, and a suite of three classrooms along the other side, with sliding partition, and glazed screens between them, so as to be able to throw the whole open to the hall. The latter is 64ft. by 29ft. 6in. On one end of hall are two classrooms and playground entrance forming a wing, and on the other end of hall a similar block, with laboratory and assistant master's room. The front block comprise the head master's room, book store, centre entrance, lavatories, &c. The hall roof has an open-timber roof. Externally, the style partakes of the English Renaissance period, with bold details; the end are pronounced by gabled ends, and the centre entrance by a gable carried above the eaves of a long, low, connecting building. A ventilating turret breaks the ridge line of hall, and the latter is lighted by a clerestory range on the roof. The turret forms an extract ventilating shaft, in which is a Bunsen burner. The details of heating show coils of pipe under the windows, with inlets for fresh air. A covered playground and gymnasium is placed along north side of ground.

The design by Mr. Horace T. Bonner, A.R.I.B.A., is also Renaissance in character, of brick, shown by a coloured perspective. The hall is placed lengthwise to the road, and is 62ft. by 32ft., with a platform and retiring-room in the rear. A front corridor broken by three bays or projecting windows for hats and coats, and two end corridors give access to the central hall, which has three classrooms along the front side. On one side is a porter's house and a classroom, and on the other the head-master's house, assistant-masters' and classrooms; these side blocks are semi-detached to the central or hall portion. The classrooms in front project and have gabled ends, the large hall being lighted by five mullioned windows over them. A centre fleche relieves the hall roof. Mr. E. Lyne Parsons, Exeter, who sends an able set of drawings, also adopts the centre hall placed lengthwise, lighted at top, with three classrooms along rear side, having movable partitions between them. The hall is 66ft. by 33ft. The boys' entrance is on north side, also one classroom and the porter's house as a retired wing. In the front are the head and assistant masters' rooms, a centre entrance, lavatory, and ante-room; the south side has a laboratory and classroom (head-master's) in front, a side corridor, and covered way to lavatories, &c., behind. The gymnasium is under south wing. The exterior treatment is of the Renaissance character, with centre tower, and gabled projections with pilasters introduced as a relief. There is undoubtedly merit in the selected design for its simple arrangement and grouped classrooms. The elevation is also suitable. The designs of Messrs. Giles, Gough, and Trollope, Clark and Moscrop, and E. L. Parsons show also a careful study of requirements.

#### SKETCHES OF DECORATIVE FURNITURE

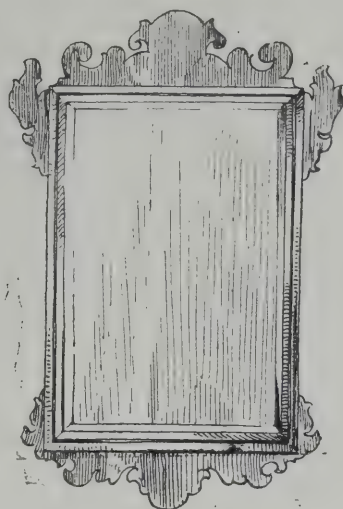
OUR illustration to-day is of some decorative furniture, at Mr. John Milner's, Great Portland-street. The Oak Cradle is a good example of Jacobean oak work; good cradles are very scarce. The example given is a quaint and fine piece of work, in good preservation it was made about 1650, and came from Swale dale, in Yorkshire. The Chippendale Mirror is in mahogany, with carved gilt head and Vaux hall bevelled plate glass. These mirrors are much copied and used at the present time. The carved gilt Mirror Frame is an exceptional fine specimen of work of the Chippendale period. The Candlestick is an example of three-light Early 18th-century work, as is well known; the Dutch were famous for both brass and copper work of that period. The Kneehole Table is a specimen of a simple writing table made in the Chippendale period.

Mr. J. O. Richardson, of Albert-road, Peckham is the contractor for the works at the General Post Office, St. Martin's-le-Grand.





OLD OAK CRADLE



CHIPPENDALE  
MIRROR FRAME

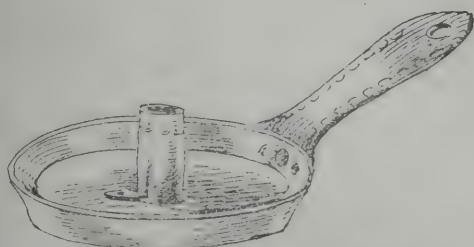


GILT MIRROR FRAME



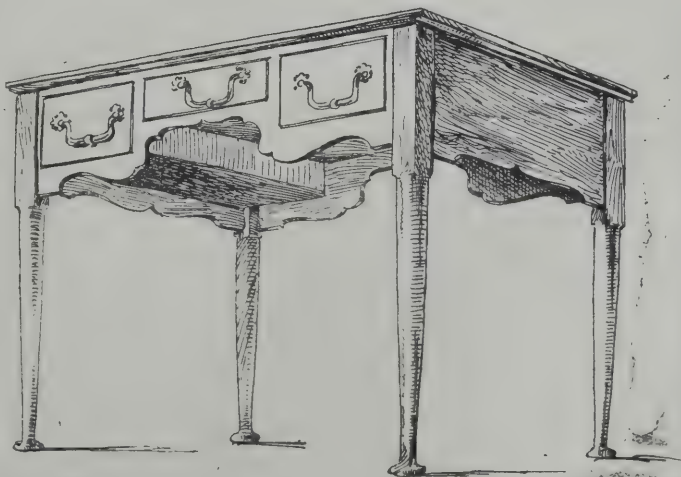
ANTIQUE BRASS CANDLESTICK

SKETCHES  
OF DECORATIVE FURNITURE &c  
AT MR JOHN MILNERS



OLD CANDLESTICK

W. & Young



SHAPED KNEEHOLE TABLE



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## OUR LITHOGRAPHIC ILLUSTRATIONS.

COURTS OF SCOTLAND SOLICITORS' LIBRARY, EDINBURGH.

THE leading points in memorandum issued by council to competing architects were that plans should provide for a reading-room, library, and hall, the desire being expressed that these should be on the same floor and at present Parliament house level—a height of nearly 60ft. above Cowgate, the two upper floors alone being used for library buildings, and the under portion laid out in any way to obtain the best commercial return. Shops and dwellings were suggested by council. The new library is approached by a connecting bridge from present law courts, and as there is a considerable amount of corridor to be traversed, I thought it desirable that immediate access should be had to the rooms most in request—viz., reading room and library. This bridge leads at once into a spacious vestibule, a broad flight of four steps, together with a slope of 1ft. in 60ft., lowering the whole library floor by 3ft. Consideration of cost caused introduction of steps down so that better effect might be given to the principal rooms of library. The reading-room and library are entered off vestibule. The former apartment measures 30ft. by 22ft., and the library 68ft. by 48ft. over the bays, and 37ft. 6in. between inside of stone walls. This room is planned on the alcove system. The bookcase blocks are made to project at right angles to walls, which gives increased accommodation for books and leaves recesses for reading and writing. In order not to curtail wall space for books, and for more practical use of blank wall space for flues from dwellings, four of the ten alcoves are lighted from ceiling by inner lights. Abundance of light is also provided from the four sides and from cove in ceiling, which is entirely pierced with lights. These latter will be formed of an outer skylight, with an inner light of tinted glass. The total possible accommodation for storing books in library and book stores is 7,570 super. feet, which gives storage for nearly 70,000 volumes. The society's hall is only used three or four times during the year by the society for meetings, and will be afterwards fitted up as an additional library; consequently, the approach through library is not considered objectionable, although in Scheme No. 1, submitted by me, access was shown by a corridor under society's hall. The floor below is utilised for consulting rooms and book stores, the latter being directly under charge of librarian. Lavatory accommodation is purposely planned away from entrance, so that the appliances may not be used by numerous clerks frequenting Parliament House. Thirty model dwelling-houses and eight shops occupy the lower portion of building, and, by a firm of ordained

surveyors and house-factors consulted by the council of society, are expected to yield a gross annual return of over £400 per annum, the net rental being £300, after deducting 25 per cent. for factor's fees, repairs, and unlet property. A fireproof floor separates model dwellings from library. Strode's ventilating sunlights will be used for lighting library apartment, the Wenham lights being used in reading-room and society's hall. The heating of building will be low-pressure, hot-water radiators being placed in bay windows under dwarf bookcases. In winter fresh air will be admitted from outside, and passed through a grating at floor level, controlled by valve apparatus, and passed over radiators before entering room, the fresh air in summer being admitted by hopper ventilators placed in bay windows, the society's hall and staircase being similarly heated. The vitiated air will be extracted into a ventilating shaft in ceiling of library, the ventilating sunlights also helping when lighted to accelerate the action. The total cost ascertained from a firm of ordained surveyors consulted by the Society is over £13,000. Building operations will not be commenced for some time, as two months are expected to elapse before ground is cleared of present tenements.

J. B. DUNN.

## ARCHITECTURAL ASSOCIATION EXCURSION.

FOR description see p. 167.

## "REDCOT," KNOCK, BELFAST.

ENJOYING the advantages of a lovely site within easy distance of Belfast, "Redcot," which has been built for Mr. Thomas Paul, is constructed of local red brick, partially covered with lime plaster, the roofs being finished with Ruabon tiles. The builder was Mr. John Bill; the architect (by whom the drawing was done) being Mr. T. McC. Johnston, 28, Waring-street, Belfast.

## THE NEW INFECTIOUS DISEASES HOSPITAL AT KING'S NORTON.

THIS hospital is being erected on land purchased from the Ecclesiastical Commissioners, and is for the treatment of patients in the contributory place of King's Norton and the parishes of Northfield and Bexley. For the past five years the rural sanitary authority has had a temporary hospital in operation, in which 180 cases have been successfully treated—one death (from small-pox) only occurring. The new hospital stands in grounds six acres in extent, and no house is within 150 yards of it. It is inclosed on all sides by a boundary wall of brick, for which Messrs. Walton Brothers, Smethwick, were the contractors. The hospital, which is built on the pavilion system, is of red brick, with Bath-stone dressings, half-timbered gables and tiled roofs, and is intended, when complete, to accommodate 40 adult patients, with full staff of nurses. The buildings included in the present contract comprise administrative block, isolation block, ward block, mortuary, and offices. The administrative block provides accommodation for the caretaker and resident nurse, with bedrooms for extra nurses, medical officers' room, surgery, and stores. A serving-hatch is introduced in the kitchen for the convenience of nurses. The isolation block contains four wards and two nurses' rooms, communicating with each other by glass-covered corridors, attached to which are the usual offices. The ward block contains one ward for six (adult) beds, and one for four (adult) beds, allowing 2,000c.ft. of air space for each patient. But as the majority of the cases hitherto treated have been children, the capacity of each block is nearly double. The blocks are raised above the ground level, and surrounded by a terrace. Verandahs stretch along the front of each block, covering a walk of granolithic pavement. Upon this the patients' beds could be wheeled if wished, as there are French casements opening out on it from each ward. The offices comprise disinfecting apparatus (Bradford's improved sub-heating), a stable with loft over, washhouse, ironing-room, with radial drying stove (Bradford's), and store-rooms; over the stable is the water tower, which will carry a tank to contain 8,000gals. of water, from which all the blocks will be supplied. The water will be pumped from a well which has been sunk

90ft. deep to the rear of the tower; and on the tower it is proposed to place a 16ft. "Halliday" windmill, which will be sufficient to throw the water the requisite height; this authority having one already in operation at their Cottage Homes, which is found to do all that is required of it. The drainage of the hospital will be dealt with on about an acre of land in the S.E. corner. The roads are already formed, and the grounds will be laid out and planted with shrubs and trees. Should an epidemic of small-pox at any time visit the district, ground is reserved upon which can be pitched a number of tents in addition to the "Docker tent," which will be removed from the temporary hospital to the new one. The hospital being five miles from the surveyor's office, provision has been made to establish telephonic communication between them, and in all probability the blocks will be connected by means of speaking tubes to the administrative block. The specialties used in the construction of this hospital are: Jennings's paraffined wood block flooring, and Manchester grates and ventilators by Mr. E. H. Shorland. The complete plans, &c., have been prepared by the architect, Mr. Robt. Godfrey, A.M.I.C.E., the engineer and surveyor to the Rural Sanitary Authority. Messrs. Gowing and Ingram, Birmingham, are the contractors; and Mr. W. de Lacy Ahern, Stud. Inst. C.E., is the superintending architect. The estimated cost of the buildings, &c., being erected now is £5,200, without the wall or cost of ground.

## INSTITUTE AND WORKSHOPS FOR THE BLIND, DEANS GATE, MANCHESTER.

THIS building is now in course of erection from the designs of Messrs. Heathcote and Rawle, architects, Manchester. The sub-basement will be used partly for the boilers and steeping-tanks, and partly for storage; the basement for brush-making; the ground floor for retail shop and show-rooms; the first floor for the board room, and for a room in which to hold the Sunday and other gatherings; and the upper stories for various industries of the blind. Every floor, except the sub-basement, will have a glazed brick dado. With the exception of the carved panellings, and some of the lower piers, the whole of the frontages will be built in red and buff brick and terracotta. The present contract of £650 is undertaken by Messrs. Wilson, Toft, and Huntley, of Manchester.

## CHIPS.

The ceremony of laying the capstone of St. Michael's Church steeple, Coventry, was performed on Wednesday week by Mr. George Woodcock. A party of about fifteen ascended by the scaffolding to the summit—a height of 303ft. The contractor (Mr. John Thompson, of Peterborough) referred to the work, and thanked Mr. Woodcock for having started the restoration fund by a donation of £10,000. The work of restoration has been in progress about three years, and is expected to be completed before the winter. The only portions yet remaining to be done are the decoration of the interior and exterior of the tower and the insertion of thirty-six statues.

Lady Butler's picture, "Scotland for Ever," painted in 1881, has been presented to the Art Gallery now in course of erection at Leeds by Colonel Harding, of Headingley. Colonel Harding has paid Lady Butler £1,000 for the picture, which will thus have produced the painter £4,000, £3,000 having been paid by Messrs. Graves, of Pall Mall, for the copyright.

The Liverpool City Council have decided to reconstruct the Elliot-street frontage of St. John's Market, at a cost of £8,000, from plans prepared by their borough surveyor.

Colonel W. M. Ducat, one of the inspectors under the Local Government Board, held an inquiry at Newton Heath last week in reference to an application of the Local Board for sanction to borrow £1,700 for the paving and surface drainage of Droylsden-road. Plans and details of the proposed works, prepared by Mr. Wilkinson, the Board's surveyor, were laid before the inspector.

New offices have just been built for the Wands-worth district board of works at a cost of £6,400. Mr. C. Kynoch was the contractor.

The memorial chapel to Williams of Pantycelyn at Llandovery was opened on Tuesday last. The cost of the building was £2,200. Accommodation is provided for about 280 worshippers. The architect is Mr. John H. Phillips, M.S.A., of Cardiff.

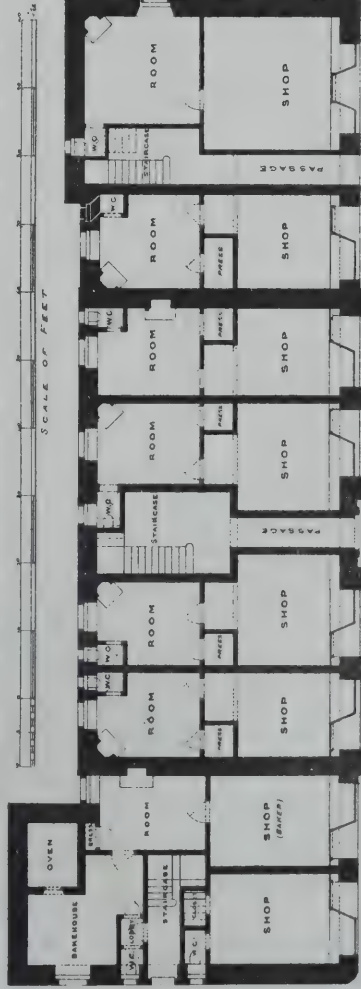
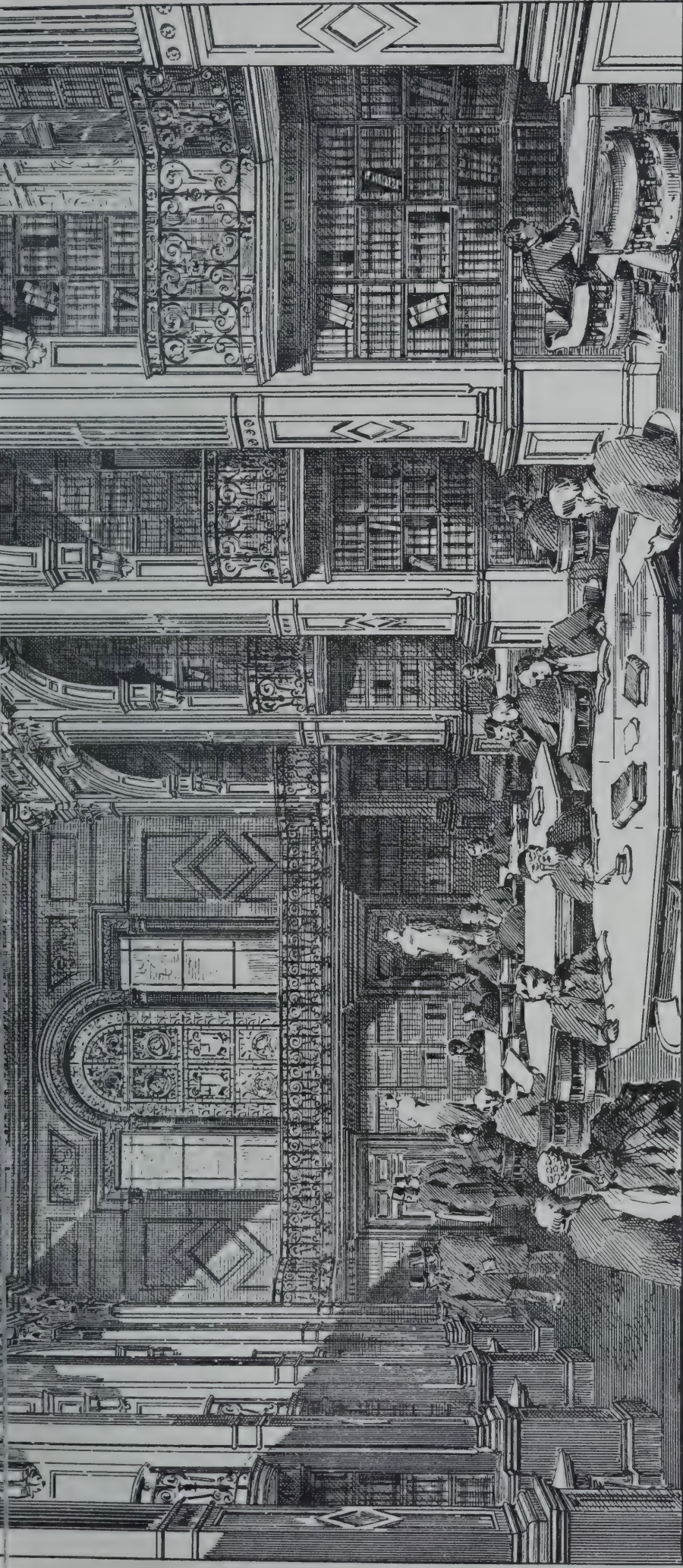




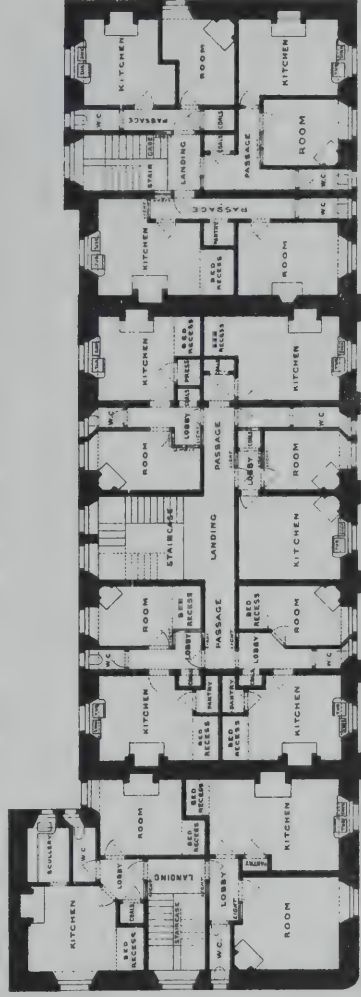








PLAN OF GROUND FLOOR



PLAN OF MODEL DWELLINGS 1ST 2ND & 3RD FLOORS

Photo Lithographed & Printed by James Acland 6 Queen Square, W.C.

COURTS OF SCOTLAND · SOLICITORS · LIBRARY · EDINBURGH · SELECTED · DESIGN · J. B. DUNN ARCHT.



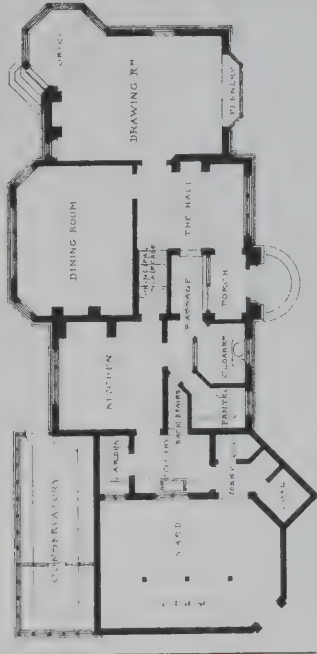








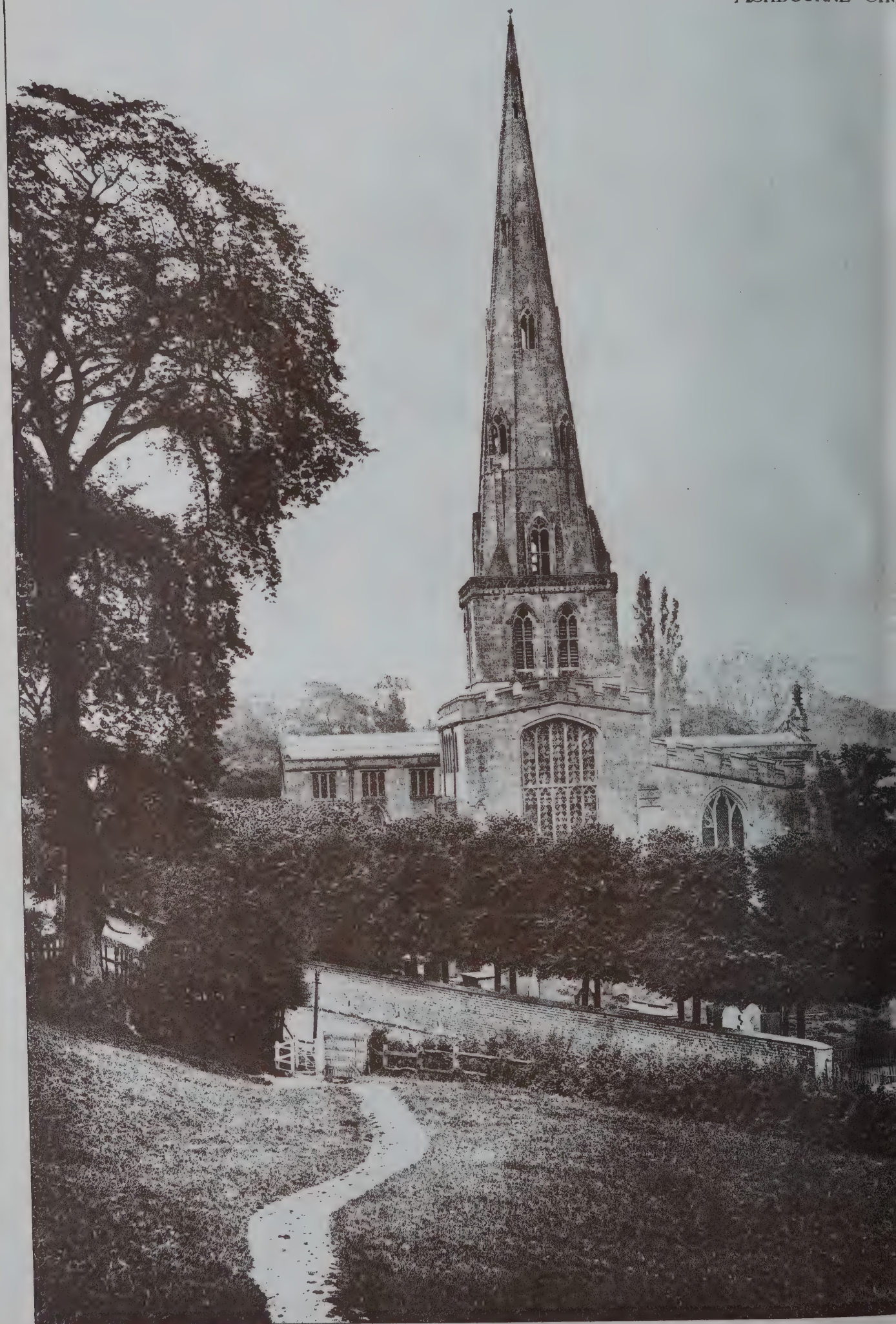
REDCOT · KNOCK · BELFAST T·M<sup>c</sup> C·JOHNSTON · ARCHT











FROM PHOTOGRAPHS BY RICHARD KEENE.



FROM N.W

INNER · GATEWAY



SOUTH · WINGFIELD · MANOR











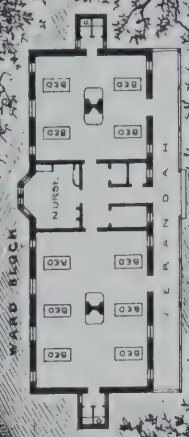
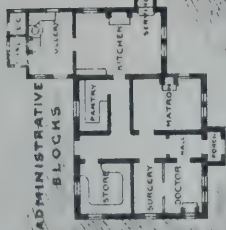


THE BUILDING DEWS, AUG. 10. 1888.





MORTUARY AND OFFICES



HOSPITAL for INFECTIOUS DISEASES  
KINGS-NORTON  
By Robert Godfrey ARCHT  
MAURICE B. ADAMS

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.









Photo-lithographed & Printed by James Akerman 6 Queen Square W.C.

INSTITUTE AND WORKSHOPS FOR THE BLIND DEANSGATE MANCHESTER  
MESSRS HENRICOTTE & RAWLE ARCHTS







WAYSIDE NOTES.

**W**HAT a pity it is that the hints on restoration work contained in the last R.I.B.A. *Journal* were not published prior to the year of Jubilee! If only the parties concerned could have taken to heart the lessons therein given we might not have to mourn the loss of so much beautiful Mediæval handiwork. Better late than never, however; as the information afforded should prove really useful. Certainly to architects undertaking a restoration job for the first time, the paragraphs so carefully set out in numerical order will prove a boon and a blessing. They may therefore be said to supply a long-felt want; and as they have been prepared under the supervision of three gentlemen of wide experience in church restoration, the hints come to us with much weight, and may be studied with confidence by young restorers—and old ones, too, for the matter of that.

One hint appears to me to be particularly worth attention; and that is, that where alterations and additions are made to an old building, such additions and alterations should be treated in a manner totally distinct from the original building. Really new work should not be in imitation of the old design. Putting aside the objections named in the Institute paper, it is sufficient to remember that the secret of many of the charming qualities of old cathedrals and churches is to be found in that variety of style which arose from the bold, open, and frank manner in which the old builders altered and enlarged existing structures. How much of the poetry of architecture would disappear if the architects of the Middle Ages had added to buildings in the style of their predecessors! Imagine the west front of Rouen Cathedral with the whole built in the style of the Early work at the base of its north tower by succeeding generations servilely copying the design of existing portions. The whole front would have been a fraud. There would be no true unity; and the unutterable glories of multiplicity of parts would have been wanting. In modern work it is exactly the same, and variation of style in added features has just the same charm.

I quite agree with most of the sentiments expressed in the essay on church restoration. One may, perhaps, be pardoned for wondering where are the architects who would be so delighted to receive advice and criticism while they are engaged on a restoration job?—although the writers of the hints may know. In theory we should all be overjoyed at such suggestions; but in reality I fear that there would be few found who would be so pleased at receiving criticisms from all sides *ad lib.* The S.P.A.B. generally prove sufficiently provoking; but we can well afford to excuse this pretty fancy, as the bulk of the essay is most practical, and, as regards utility, far above the average run of papers in the *Journal* of the Institute.

The Gloucester baths competition has gone the way of the majority of architectural lotteries. I note that the whole question is to be reconsidered by a special committee of the Gloucester Town Council. A pretty dance the Gloucester people have led their premiated architects! As matters now stand, it appears that the competitor placed first is in danger of losing the job. Meantime the second premium winner is making hay whilst the sun shines, by writing to the town council, and putting forward the merits of his own plan, &c., the which procedure might, I think, have been delayed till the so-called successful competitor had been overthrown by a report from the special committee—if he ever is.

There is another good architectural competition gone wrong—that for the Clapham Free Library. I quite think that Mr. John J. Jones was well advised in taking the course he did in this matter. If a few more would put their foot down when they see attempts made to impose upon the profession, as represented by themselves, we should be treated with more respect as time goes on. In this Clapham affair it seems to me that the commissioners felt ill at ease in awarding the first place to a design which did not comply with the instructions as regards cost; and that they therefore endeavoured to quiet their consciences by

drawing a cheque for ten pounds in favour of the second premiated competitor, who had submitted a design that could have been carried out for the stipulated sum.

Both the difficulty at Gloucester and the incident at Clapham have had their origin in that which, if not the root of all evil in architectural competitions, is yet responsible for nine-tenths. This is the money question, and a very difficult question it is, and one that has now been before us for a very long time. One can quite understand that if a building committee finds itself in possession of a design that is wholly superior to any other, yet costs a little over the stipulated sum, they will naturally feel that although they would like to deal honourably by the competitors, they do not care to erect an imperfect building when for a slightly increased outlay they can secure one vastly better suited to their wants. This difficulty has been the cause of innumerable heart-burnings and bitternesses in the past, and will continue to be so till the end of time, unless some plan be invented whereby it may be surmounted. In dual competitions the difficulty does not occur; but in small ones it is ever recurring, to the disgust of those concerned, though, perhaps, to the benefit of the architectural topical world, which, without a few competition squabbles, would tend to become dull in the big gooseberry season.

There are few things that are more annoying to the building owner than to find that his neighbour has, by "squaring" the authorities, been allowed to encroach upon the general building line. The extremely bitter feeling which an incident of this nature creates may be noticed in the present Board of Works Inquiry. Much of the animus evidenced against the Board by builders has been caused by the partial action of the Board's officials with respect to frontage lines. Yet another instance occurred at the last meeting of the Commissioners. Encroachments on the building line are annoying enough to the architect, but to the owner of the buildings encroached upon it is something more than an annoyance. The report of the Board of Works Commission will be looked forward to with great interest. It will be published in about two months.

I think that if Lord Herschell had been presiding at the recent meeting of the London School Board he would have discovered a few things worth further investigation. One cannot but conclude that the whole thing was a great farce. Does the Board imagine that a nice little family party amongst themselves gathered together to write a few letters and joke about serious matters will be the means of regaining the confidence of the public? If so, I fear that it will be grievously disappointed. As it was, with all the care taken, ugly facts would crop up. In the face of this and of the disclosures in the matter of past school building, it is urgently necessary that some inquiry be at once instituted. The amount of public funds at the disposal of the School Board is immense, and for this reason an inquiry is as important as in the case of the Metropolitan Board of Works.

Like your correspondent, "A Registrationist," I have been long wondering when we shall hear something about the inquiry which the Institute was to make in connection with the M. B. W. scandals. Some say that I may well wonder; but, then, people say such funny things! I cannot believe that the Institute is going to let the matter drop; because, were it to do so, it would be its death-blow. I repeat that it is impossible for the Institute to let this matter slide—impossible, because the charges to be investigated are of the gravest character. Why does not the council at once proceed to take such steps as will clear its members of these charges, if, in the eyes of the Institute, they be not serious? And if they be proved unprofessional, why is there not a considerable clearance at Conduit-street? In this matter I feel a callous indifference to the opinion of any section of the profession. All I can see is that the public sneer and joke at the mention of an architect; that this has been occasioned by the action of certain members of the Board of Works, and that these persons, being members of the Royal Institute of British Architects,

the credit of that body, and with it the whole profession, is at stake, unless measures be taken to prove the legitimate nature of the behaviour of the above persons. And yet everyone is silent! Save for the few communications that you have printed, no protest has been made, and no one has endeavoured to bring pressure to bear upon the Institute to persevere with the inquiry it contemplated, and to take measures—vigorous and severe, if necessary—that will insure us being, in some degree, lifted out of the unsavoury mire which threatens to engulf us. GOTH.

DISCOVERIES AT PETERBOROUGH CATHEDRAL.

**D**R. PEROWNE, the Dean of Peterborough, announces that in the course of the excavations necessary for underpinning the interior of the north transept of Peterborough Cathedral an interesting discovery has been made. Close to the western wall of the transept the workmen came upon a richly ornamented Saxon slab, covering a grave, and evidently still lying in its original position. It is of the date of the second Saxon church, of which considerable remains were discovered a short time since after taking down and rebuilding the central tower. The slab must mark the grave of a layman, and has lost during the Norman rebuilding a few inches from the top; the length remaining is about 5ft. 3in., with a top width of 1ft. 10½in. and a bottom of 1ft. 6in. The surface is completely covered with the richest Saxon interlacing ornament, forming a design of a central band of ornament about 5in. wide, crossed at right angles by rather wider strips of ornament. The design is that of a fourfold cross, each of the crosses being outlined with a double roll border, the inner one being twisted work. Three of the oblong spaces between the crosses are filled in with finer interlacing work, two with star crosses, and one is plain, having been left unfinished. The slab is, the Dean believes, the most beautiful specimen of Saxon ornamental work of the kind that has come to light. The committee have decided to raise the slab, keeping it on its present site, so that it may still mark the resting-place that it originally covered, but above the level of the new floor and guarded from injury. It was found close beside the spot where rest the remains of Bishop Dove, Queen Elizabeth's "Dove with silver wings." Portions of other Saxon slabs have also been discovered not far from the one described, of similar design, but of less elaborate workmanship; also a fragment of the raised monument of a Saxon abbot. Of Hereward's church, the outline can be traced to a considerable extent. The lines of the transept and the choir can be followed in the south transept, under the lantern, and in the nave of the present cathedral; but the nave of the Saxon church lay outside the present building. Measurements carefully made show that the present Norman cathedral is exactly double the size of the Saxon church.

The opening of the new storage reservoir for the Portishead Water Company took place last week. The storage has been supplemented by constructing a reservoir on the site of an old mill pond, near the spring head at Portbury, holding 1½ million gallons, according to plans prepared by Mr. Walter Minns, of Portishead. The contract of Messrs. George Biss and Son, of Portishead, was accepted, and that firm has carried out the whole of the works, having excavated 5,000 cubic yards and built a new retaining wall across the valley in thirty-four working days.

Standlake Church, Oxon., was reopened last week, after the completion of another section of the restoration now being carried out, from plans by Mr. Clapton Rolfe. The north transept and north aisle have been restored, and the slated roofs replaced by leaden ones, works carried out by Messrs. Barnes and Son, of Witney; and a new font and oak corbels and other internal works of carving have been executed by Mr. Harry Hems, of Exeter, who has in hand a parlous screen for the church.

Dr. Alfred Barry, Bishop Metropolitan of Sydney, and formerly Master of King's College School, who is nominated as Bishop of Chester, is a son of the late Sir Charles Barry, and younger brother of Mr. Charles Barry, F.S.A., and the late Professor E. M. Barry, R.A.

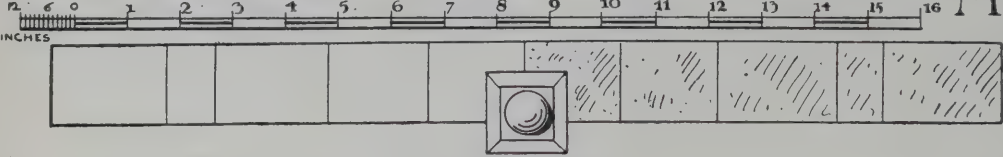


# A CORNER MIDDLE CLASS HOUSE AT HAMPSTEAD N.W.

MAURICE B. ADAMS

Architect

Scale of feet



DETAIL

Plan of Coping

ILLUSTRATING PAPERS ON

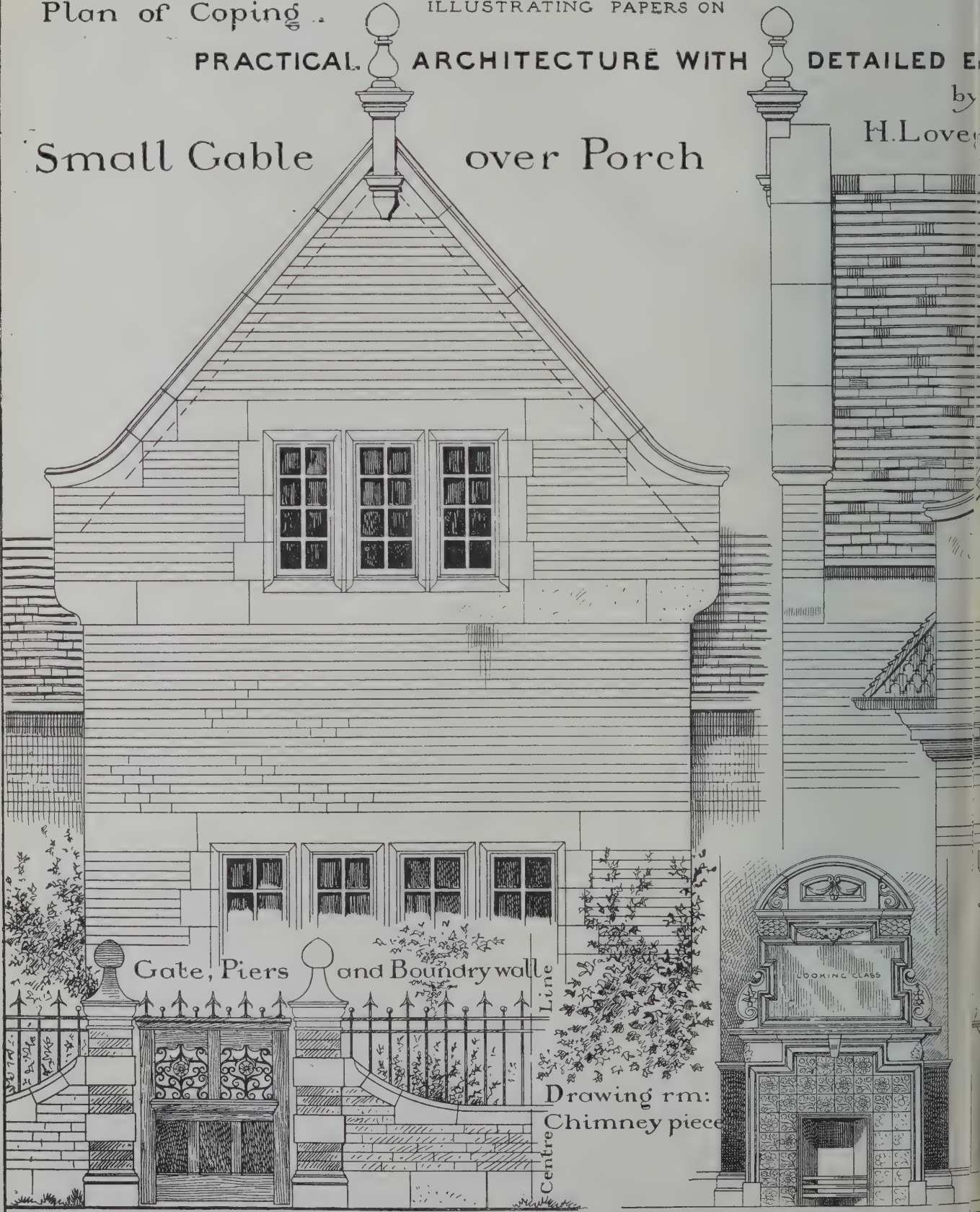
PRACTICAL ARCHITECTURE WITH DETAILED E

by

H. Love

Small Gable

over Porch



Gate, Piers

and Boundry wall

Line

Drawing rm:

Chimney piece

Centre



N<sup>o</sup> 5A

R.I.B.A

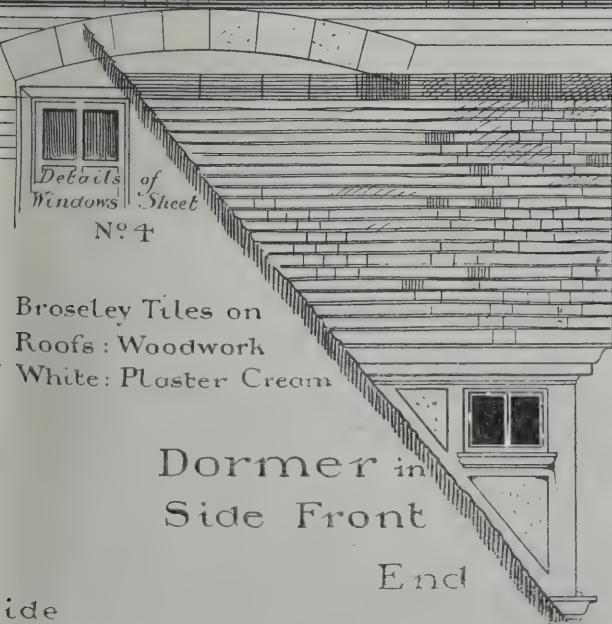
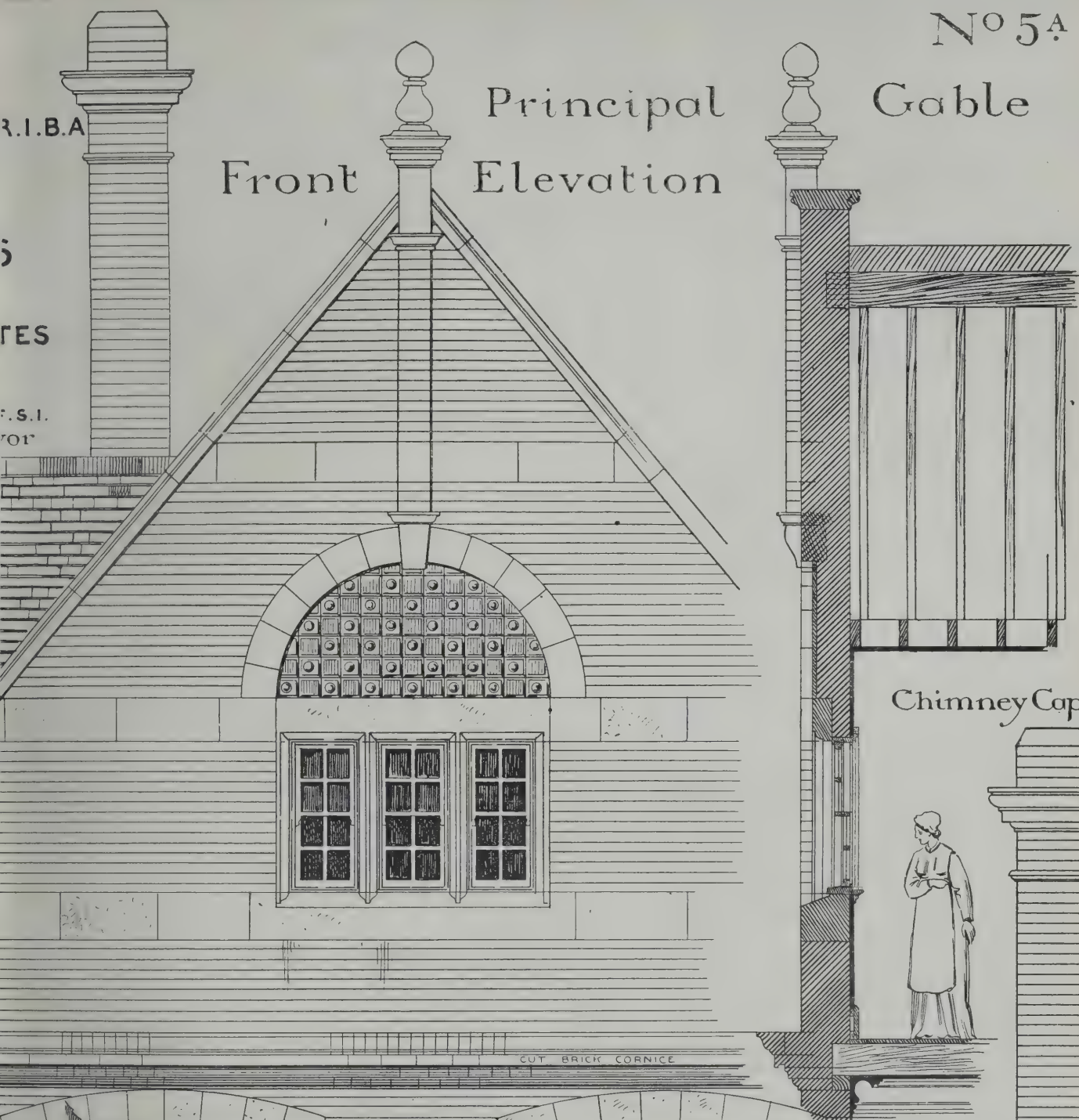
S

TES

F.S.I.  
ror

Principal  
Front Elevation

Gable



Broseley Tiles on  
Roofs: Woodwork  
White: Plaster Cream

ide







MASON. £ s. d.  
The stone to be of the best description, free from  
vents and all other defects, and set on its  
natural quarry bed .....

RED CORSHILL STONE AND SETTING IN CEMENT.

Cube. Stone, including hoisting and setting...	
Cube. do. in scantling lengths not exceed-	
ing 8ft. and do.	
Cube. Extra only for hoisting stone over 40ft.	
from ground .....	
Cube. Do. do. 60ft. do. ....	
Supl. Labour, half sawing .....	
Supl. Do. rough sunk work .....	
Supl. Do. do. circular .....	
Supl. Do. beds and joints .....	
Supl. Do. sunk joint .....	
Supl. Do. do. arch do. ....	
Supl. Do. do. circular joint .....	
Supl. Do. plain face .....	
Supl. Do. sunk face .....	
Supl. Do. do. circular .....	
Supl. Do. do. and stopped .....	
Supl. Do. circular sunk face to swelled	
and diminished shaft .....	
Supl. Do. moulding .....	
Supl. Do. do in short lengths .....	
Supl. Do. do. circular .....	
Supl. Do. do. do in caps and bases .....	
Supl. Do. do. stopped .....	
Run. Do. plain face 4in. wide .....	
Run. Do. do. 4½in. " .....	
Run. Do. do. 5in. " .....	
Run. Do. do. 6in. " .....	
Run. Do. chamfer or sinking 3in. wide .....	
Run. Do. do. 6in. wide .....	
Run. Do. stopped chamfer 4in. wide .....	
Run. Do. rebate 4in. girt .....	
Run. Do. 6in. " .....	
Run. Do. 7in. " .....	
Run. Do. 9in. " .....	
Run. Do. stopped do. 4in. ....	
Run. Do. sunk rebate 6in. girt .....	
Run. Do. 9in. " .....	
Run. Do. 7in. " circular ...	
Run. Do. sunk face 7in. wide .....	
Run. Do. stopped do. 4in. wide .....	
Run. Do. 5in. " .....	
Run. Do. 7in. " .....	
Run. Do. 11in. " .....	
Run. Do. moulding 8in. girt .....	
Run. Do. do. 10in. " .....	
Run. Do. do. 11in. " in short	
lengths .....	
Run. Do. circular moulding 3in. girt .....	
Run. Do. 9in. " .....	
Run. Do. stopped moulding 8in. " .....	
Run. Do. 9in. " .....	
Run. Do. 10in. " .....	
Run. Do. groove for iron-tongue .....	
Run. Do. and burning in lead	
flashing .....	

Stops to sinking average 8½in. wide .....	
Mitres to .....	
Stops to moulding, average 12in. girt .....	
Spliced .....	
Moulded stops to do. 8in. girt .....	
Mitres to moulding, average 9in. do. ....	
Obtuse .....	
1ft. 11in. girt .....	
Perforations through 6in. stone, 14in. by 9in.	
for flues .....	
Fair ends to 12in. by 4in. band .....	
Forming stools for reveals moulded 8in. girt,	
with mitre on sply, and 4ft. high .....	
Do. 22in. girt and 8in. high .....	
Do. 11in. girt and 6in. " .....	
Do. for mullion 18in. girt and 8in. high .....	
Do. do. 22in. " and 8in. high .....	
Do. do. 16in. " and 4in. high .....	
Bosting and carving ornaments to base of	
column on circular face about 10in. by 4ft. ...	

LABOUR AND MATERIALS.	
Run. Bedding eaves gutter on stone cornice	
Run. 14in. by 4in. coping moulded and throated,	
both edges set in cement, including all joints,	
iron cramps, &c., and running with lead .....	
Run. Do. raking .....	
Run. Do. circular .....	
Returned moulded and mitred end to coping	
Pieces of straight coping as last out of 9in. by	
14in. by 7in. circular on front forming mitre	
of straight and circular set in cement .....	
Do. do. out of 1ft. 6in. by 1ft. 2in. by 1ft. sunk	
to form mitre of raking and straight do. do.	
Run. 21in. by 6in. coping moulded both edges	
to raking gables set in cement, including	
joints, cramps, &c., as before .....	
Run. Do., and allow for extra hoisting over	
40ft. from ground level .....	
Ornamental ball terminals out of 9in. by 9in.	
by 2ft., and hoisting and fixing with neces-	
sary dowels in cement to apex of gable above	
50ft. from ground level .....	
Apex stone 3ft. by 1ft. 9in. by 2ft., sunk and	
moulded both sides to form a part of coping	
set in cement and hoisting and fixing as	
last .....	
Do. 4ft. 3in. by 2ft. 6in. by 3ft. 6in. do. do.	
also base of finial .....	
Bond stones out of 1ft. 9in. by 1ft. 9in. by	
1ft. 4in., sunk and moulded both sides to form	
a part of coping, and hoisting and setting	
in cement .....	
Do. out of 2ft. by 1ft. 9in. by 1ft. 4in. do. do.	
Do. out of 1ft. 9in. by 1ft. 9in. by 1ft. 4in. do.	
do. over 40ft. from ground level .....	
Kneelers out of 1ft. 9in. by 1ft. 9in. by 9in. sunk	
with circular moulding moulded at end and	
setting in cement .....	
4in. pier cap 1ft. 7in. by 1ft. 7in. weathered on	
top four ways, moulded and throated to edges	
and setting in cement, with necessary dowels	
to brick piers .....	

2 Corbels out of 11in. by 18in. by 14in. worked	£ s. d.
fair at sides, moulded on front, and built in	
in cement .....	
4 Iron cramps and letting in and running with	
lead .....	
72 Slate dowels, mortises, and cement .....	

HARD YORKSHIRE STONE AND SETTING.

Ft.	
126 Supl. 2in. rubbed paving bedded and jointed	
in mortar .....	
28 Supl. 2in. do. slab and hearth do. ....	
32 Supl. 6in. do. landing do. ....	
26 Supl. 6in. do. do. scantling one way do. ...	
19 Run. Labour to throat .....	
4 Run. Do. do. rubbed margin at back of 7in.	
step .....	
35 Run. Do. do. tooled chamfer 6in. wide, stopped	
No. 10 stopped ends to do. ....	
13 Run. Labour rubbed edge on 6in. stone .....	
6 Run. Joggle joint and cement to 6in. landing	
9 Run. 12in. by 3in. rubbed and backjointed	
step in one length .....	
4 Run. 16 by 3 do. do. ....	
6 Run. 16 by 3 do. do. ....	
4 Run. 20 by 3 do. do. ....	
27 Run. 12 by 6 rubbed solid step scantling 9ft.	
lengths .....	
9 Run. Do. backjointed do. do. ....	
136 Run. 12in. by 7in. rubbed solid steps, in-	
cluding joints .....	
4 Run. Do. backjointed .....	
6 Run. Do. do. scantling .....	
16 Run. 14in. by 4in. cover to wood girder coped	
No. to widths .....	
11 Fair-jointed ends to steps .....	
25 Do. rubbed do. do. ....	
68 Ends of iron bar let in and run with lead .....	

CHIMNEY-PIECES AND HEARTHES.

No.	
5 Chimney-piece p.c. £4, and allow for profit and	
carriage .....	
5 Ornamental wood chimney-pieces p.c. £10 each	
and allow as before .....	
2 Do. p.c. £15 Do. ....	
12 Fixing only chimney-pieces to 2ft. 6in. average	
opening .....	
Yds.	
12 Supl. Tile hearths, p.c. 12s. per yard, and	
bedding and jointing in cement .....	
No.	
11 Marble moulded fender, £2 10s. each p.c., and	
fixing, including joints in cement .....	
Case up and protect stonework, clean down, and	
leave perfect .....	

Carried to summary ...

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

KENT ARCHÆOLOGICAL SOCIETY. — The annual meeting of this Society was held on Wednesday and Thursday in last week, Hythe being selected as the head-quarters. The archæological portion of the proceedings commenced on the first day by a visit to Hythe Church and its Early English crypt, which was described by the vicar. Afterwards the party started in carriages for Studfall Castle, where the remains of the Roman Castrum were described by Mr. C. Roach Smith, F.S.A. From thence a visit was paid to Lympne Church and Lympne Castle, otherwise called the Arch-deacon's House, both of which were described by Canon Scott-Robertson. The next halt was Aldington, where the rector, the Rev. G. J. Blomfield, described the church of St. Martin and the small remains of the archiepiscopal manor house. An evening meeting was held at the Sessions House, Hythe, where papers were read by Mr. George Wilks on the town and church of Hythe, and by Mr. George Dowker on Studfall Castrum. Thursdays proceedings commenced with a visit to St. Martin's Church, Cheriton, and St. Nicholas Church, Newington, the rectory and church at Lyminge. At the rectory interesting relics dug up from Saxon graves at Lyminge, a large collection of rubbings from monumental brasses, and some valuable manuscripts and books were shown. Saltwood Castle and church were also visited.

ROYAL ARCHÆOLOGICAL INSTITUTE. — The annual congress of this body was opened in the Town Hall, Leamington, on Tuesday, under the presidency of Lord Leigh. Lord Leigh gave an outline of the objects of interest which they were about to inspect. The members afterwards went by train to Stratford-on-Avon to inspect the scenes of Shakespeare's infancy, education, and after life, visiting his birthplace in Henley-street, the grammar school which he attended as a boy, the Guild Chapel, in Chapel-street, the garden and site of New Place, where he lived after his retirement, the Memorial Theatre and market fountain, lately erected in his honour, and the parish church, which contains his ashes and his tomb. The opening of the antiquarian section by the Rev. J. Hirst took place at Leamington in the evening. On

Wednesday the members visited Broughton Castle, Compton Wynyates, and Adderbury; yesterday (Thursday) was devoted to Warwick Castle and Leicester's Hospital; to-day the members go to Kenilworth, Steaneleigh, Baginton, and Guy's Cliff; to-morrow to Coventry, with its noble churches; and on Monday to Baddesley Clinton, Knowle, Solihull, Meriden, and Berkswell.

COMPETITIONS.

THE ALEXANDER THOMSON MEMORIAL. — At a meeting of the trustees held in Glasgow on Wednesday, the 29th ult., Mr. David Thomson, President of the Glasgow Institute of Architects, in the chair, Mr. Wm. James Anderson, who gained the architectural travelling studentship in December last, submitted the sketches which he had made during his tour in Italy, together with a manuscript descriptive memoir. The sketches, 64 in number, with nine sheets of measured drawings, were exhibited on the walls, and carefully examined by the trustees, who felt extremely gratified with them as evidence of Mr. Anderson's diligence and industry while on his tour, and of the skill and ability which he has displayed. In the national competition at South Kensington the silver medal has just been awarded to the same drawings of Mr. Anderson, which, it will be remembered, were illustrated in the BUILDING NEWS for April 3 and 27 last, and were measured work from Queen's Park Church, Glasgow, designed by the late Alex. Thomson. The competitive drawings of two of the other candidates for the Alexander Thomson Studentship have also gained prizes at South Kensington.

DUDDINGSTON. — At a meeting of the Duddingston Local Authority, held at Portobello on Tuesday, the report of the committee appointed by the various parishes in the combination for a fever hospital was read and agreed to. It stated that the ten plans sent in had been examined by Mr. Morham, city architect, Edinburgh, and the one entitled "Efficiency with Economy" chosen on account of the very efficient internal arrangements. In it the hospital was arranged in order that more than one kind of disease could be treated at one time. The total cost would be £3,212. The architects of the successful plan are Messrs. Thornton, Shields, and Thomson, George-street, Edinburgh.

KENSAL TOWN. — The design of Messrs. Demaine and Brierley, architects, of York, has been selected for a new church and mission-hall for the newly-formed Parish of St. Thomas, Kensal Town, London. The estimated cost is £5,500. Five London architects were also invited and submitted designs.

LONDON, S.W. — Mr. Edward Francis C. Clarke, of 7, Westminster Chambers, has been chosen, in limited competition, architect for the new institute, gymnasium, concert rooms, &c., in Buckingham Palace-road.

NEW YORK. — The proposed cathedral for New York is to be the largest and costliest church structure in the United States. Designs are now being prepared for the trustees by selected American architects for the preliminary competition, but outsiders who choose may send in unframed drawings, to be delivered flat in a sealed portfolio, expressage paid, on or before December 15, 1888, directed to the Trustees of the Cathedral, See House, 29, Lafayette-place, New York City. These are to be mere sketch designs, and to consist of a ground plan in black and white, on a 1-16th scale; a front and side elevation and a longitudinal section, drawn without shading in pen and ink on above scale; and a perspective drawn with vanishing points 8in. apart, the building to be set at 45 deg. with the picture plane. This perspective to be in pen and ink without painting or shading other than black lining. All plans not accepted for the second competition will be returned to their owners. The cathedral will stand facing south, and its length will not exceed 400ft. The building must be strictly fireproof; no inflammable materials must be used. The exterior to be of marble, granite, or other durable stone; but no sandstone or porous material to be used, either in ornamentation or construction, that is exposed to the weather.



## Building Intelligence.

**DENSTONE, STAFFS.**—The memorial stone of the great hall by which the buildings of St. Chad's College, Denstone, will be completed was laid on Wednesday week. The material to be used is coursed Alton and Hollington stone, like the rest of the College buildings, with which the style will correspond, being an Early type of Gothic. The contractor is Mr. Bentley, of Waltham Abbey, who carried out the greater part of the chapel, under Mr. Garland, the clerk of the works. The designs are by Mr. R. Herbert Carpenter and Mr. B. Ingelow, of London, the College architects.

**SEACOMBE.**—The foundation-stone of the new Catholic Church of St. Joseph, which is being erected within the Presbytery grounds in Wheatland-lane, Seacombe, was laid on Friday by the Right Rev. Dr. Knight, Bishop of Shrewsbury. The church is being built from designs by Mr. Edward Kirby, 5, Cook-street, Liverpool. The style is Gothic, and the building will be seated for about 600 worshippers. The principal dimensions are: Length of nave and chancel, 120ft., to be ultimately extended to 135ft. when the porches are built; width of nave from centre to centre of columns, 29ft., and across the aisles, 53ft.; height from floor to nave ridge outside, 60ft. The external walls will be of Liscard sandstone facings, with red Runcorn stone dressings to the aisle and clerestory windows, and all the other door and window openings. The windows will be filled with lead glazing, and the ceiling will be of pitch pine, the chancel walls and roof corresponding in height to the nave. The contract for the work has been placed in the hands of Mr. John Shaw, builder, Priory-street, Birkenhead; and Mr. H. L. Whittingham has been appointed clerk of the works. The heating apparatus will be supplied by Messrs. Grundy, of Manchester. The present outlay will be £3,500.

## Engineering Notes.

**NABURN.**—Prince Albert Victor of Wales has opened the new lock at Naburn on the Ouse Navigation. It has been constructed almost parallel with the old lock, situate some six miles below York. It is 152ft. long and 26ft. wide, with depth over lower sill at spring tides of 13ft. 6in. The length of the old lock is 90ft., and it is 21ft. wide, with depth over the lower sill of 10ft. 6in. The work has cost about £10,000. The lock will be filled through a circular sluice 4ft. 9in. in diameter, worked by a cast-iron stop valve, and be emptied through four square openings in the lower gates closed by wrought-iron flaps. The river will now be available at spring tides for steamers of 400 tons carrying capacity. In addition to the construction of the new lock, other measures have been adopted to improve the navigation of the river. The shoals between Naburn and Selby are being dredged, and the Ouse Navigation Committee have ordered a new steam tug from Messrs. Heppell, of Shields, fitted with compound surface-condensing engines and twin screw. The improvements on the Ouse have prompted the traders on the river Foss to make exertions for their own special behoof, with the result that the Castle Mills lock will now be lengthened to 100ft. It will also be widened, and the channel deepened to 7½ft. of water. The new lock at Naburn has been constructed by Messrs. Nelson and Sons, of York, under the superintendence of Mr. A. F. Fowler, the resident engineer.

The sanitary committee of Bristol, by way of experiment, have had a new kind of pavement laid in Park-row, composed of cement and sand, which is expected to be more economical than the stone paving. The cost of stone in Bristol is 5s. 3d., and that of the new material 4s. per yard, but in the case of laying gas or water pipes the new style of pavement would have to be cut up, whereas in the case of the stone pavement it can be taken up and relaid.

A memorial window to the late Sir Robert Phillimore, late Dean of Arohes, has just been placed in Shiplake Church, Berkshire, depicting Moses the Lawgiver and Solomon the Just Judge.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX, XL, XLI, XLIV, XLV, XLVI, XLVII, XLVIII, XLIX, L, LI, LII, and LIII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—L. and Co.—F. B. and Co.—W. B. W. and Co.

A YOUNG BEGINNER. (We are pleased to hear you derive benefit from the articles on Surveying. The subject of Levelling will be included in the series.)—SERVANT. (The examinations are held at the R.I.B.A., 9, Conduit-street. Possibly the secretary of that body will send you particulars. We have seen no official announcement for some years.)

## Correspondence.

### PRACTICAL ARCHITECTURE.

To the Editor of the BUILDING NEWS.

SIR,—You are abundantly redeeming your intention expressed a few months back to devote more space to practical matters. I hear on every side appreciation of Mr. Lovegrove's papers on Practical Architecture, and the series on Houses and Staircases, Land Surveying, and the Turkish Bath are each alike capital. I hope it is not rude to say so, but I would give up all the politics of the profession, new charters, registration, and the rest of it, and should not care if you never reported another meeting of the Institute, or the Society either, so long as you fill your space so much better. Now, a faint—well, not a grumble—a suggestion. Can't you give us more practical papers about building processes? I should like to see some practical articles written by practical workmen themselves—say on Masonry, Bricklaying, Carpentry, Plumbing, Painting, &c. The ordinary writers on these subjects do walk round their subjects so that it is impossible to follow them. Excuse my boldness—I only wish I could help you.—I am, &c.,

OLIVER TWIST.

[We wish you could, or that men of the class you mention would. They are hard to find in the building trades. It is not so elsewhere. It is pretty well known that our experience is manifold in journalism—and in other fields—in such a journal as the *English*

*Mechanic*, for instance—our best helpers come from the workmen. If encouragement is needed, we can only say we should be delighted to receive and consider really practical papers about the arts of construction and decoration from workmen.—Ed. "B.N."]

### GLOUCESTER BATHS.

SIR,—In your last issue you illustrate the selected design for these buildings, as modified for execution. The modifications have, however, resulted in leaving nothing whatever of the selected design.

The whole plan is entirely new, the idea of arrangement copied from a plan sent in by us. The elevations and sections are altogether new. In the original plan the first-class bath was placed on a different level to the second, and almost out of ground with other features of construction now entirely remodelled.

In fairness to all parties concerned in this business, Mr. Trew should ask you to illustrate his original design, which was awarded the first place.—We are, &c.,

JOHN GILES AND GOUGH,

28, Craven-street, Charing-cross, W.C.,  
London, Aug. 3.

### CHIPS.

At a vestry meeting held at Kettering on the 2nd inst. it was decided to take steps for restoring the parish church, Mr. A. W. Blomfield, A.R.A., to be the architect, and the outlay about £7,000.

The foundation-stone of new buildings about to be added to the Loughborough Chapel, Coldharbour-lane, S.W., was laid on Tuesday week. The additions comprise, on the ground floor, a new vestry 20ft. by 16ft., an infants' class-room 16ft. by 16ft., and an alteration to the present building to form a lecture-room 36ft. by 21ft. On the first floor the present school-room will be enlarged, providing a hall 62ft. by 36ft. The elevations will be built in gault brick, with stone dressings. The architects are Messrs. Habershon and Fawcner, of Bloomsbury-square, and the builders are Messrs. T. Gregory and Co., of Station Works, Clapham Junction. The works will cost £1,000.

Mr. E. H. Shorland, of Manchester and London, has recently supplied his patent Manchester grates to the new Board schools, Castle-hill, Edinburgh. This makes the fifth school this year for the Edinburgh School Board which has been warmed and ventilated by means of Shorland's patent Manchester grates.

The fever hospital at Stockport is being extended from plans by Mr. A. M. Fowler, the borough surveyor. Mr. Bateson, of Stockport, is the contractor.

Providence Chapel, Snodland, near Rochester, having been acquired by the trustees of the adjoining British schools for extension purposes, a new chapel is being built on another site, Mr. Wilfrid, of Rochester, being the contractor. The foundation stone was laid on the 1st inst.

The Tamworth town council has adopted plans prepared by Mr. Joyce, of Stafford, for the proposed municipal buildings.

The foundation stone of the new post and telegraph office at Inverness was laid on Friday by Sir H. C. Macandrew. The new post office, which is being erected from designs by Mr. Robertson, of Her Majesty's Board of Works, Edinburgh, will cost about £12,000.

Sir John Lubbock has bought the estate of Kirkstall, near Leeds, which includes the ruins of Kirkstall Abbey.

The two stained-glass windows given to the West Church, Stirling, by Mr. William Connal, of Solsgirth, were unveiled on Friday. The windows were erected by Messrs. W. and J. J. Kier, Glasgow.

At a meeting of the Oldbury Local Board on Friday a discussion took place on the propriety of erecting public buildings for the town, and the matter was referred to a committee of the whole board to consider the subject and report as to the question of cost. The town has just decided to adopt the Free Libraries Act.

Mr. E. B. Hearne, C.E., late assistant to Mr. J. L. D. Meares, town surveyor of Newry, has been appointed resident engineer of the Belfast Main Drainage Works. The works cannot be accomplished under four years, and the cost will be about £300,000.

On Saturday afternoon six memorial stones of the new Wesleyan Sunday schools were laid at Gee Cross, Hyde. The estimated cost of the building is £1,370; and the architect is Mr. G. Gill, of Ashton-under-Lyne.



## Intercommunication.

### QUESTIONS.

[9703].—**Practical Architecture, with Detailed Estimates.**—In the BUILDING NEWS of August 3rd, under the foregoing title, it states in the Mason's Specification, in describing "Dressings," that the "arches," "jambs," and "columns" of porch "to be of red Dorsetshire stone of the best quality, and laid upon its natural quarry bed." Would it not have been safer to have specified the stone to be laid [where—(or) when] practicable on its natural bed, as I scarcely think the foregoing could be laid as stated—at any rate, not with Dorsetshire stone in the district I am of. In paragraph 46 it describes "All top steps and thresholds" to be, &c. Does not the latter term cover the former? Clause 41 says, "All work exposed to injury to be properly cased up and cleaned down at completion," by which I understand that only the work liable to be damaged is to be cleaned. Would it not have been better somewhat as follows?—"All work exposed, or liable to injury, to be properly protected, or cased [up—off], and the [works generally—] who's works [where required—where necessary—(or) as directed] to be cleaned and pared at completion, or just prior to the contractor handing over the building for occupation."—TOLOP.

[9704].—**The Employers' Liability Bill.**—Having read your article on this subject in the BUILDING NEWS, page 97, I beg to ask your opinion as to who will be legally liable, under the new Bill, in the following case:—I have a brickyard; I find the machinery and pay for keeping it in repair. My brickmaker contracts to make at a price per thousand; he finds all the men and lads; he engages and dismisses them without consulting me; he agrees with them about wages; one of his men attends to the engine and boiler and machinery under his orders; he finds fuel. I may be absent from the yard for days or weeks; I instruct him to get the machinery protected at my cost always promptly. Secondly, can you recommend any printed form to be put up in the yard on this subject? If so, please give a sketch of such form.—Z.

[9705].—**Lightning Conductors.**—Will some reader be good enough to state the usual rule for measuring lightning conductors when a price per foot lin. is accepted, which has to include the copper plate in ground, and also the spiked rod at end? Should the two latter be measured as tape?—VIRGINIUS.

[9706].—**Honours Exam. in Building Construction.**—Would someone who has studied for the above examination kindly inform me as to what book on strains, formulae, &c., is necessary to pass the exam. without going into difficult mathematical calculations?—VERITAS.

[9707].—**Architect's Liability.**—A. designed and superintended the erection of a warehouse for B., the packing room being on the ground floor. After a period of three years dry rot is discovered in the floor of packing room, which was constructed in the usual manner, that is, having red deal joists and pugging, the ground being sunk underneath to a depth of 18in. or 2ft., and ventilated by means of 9in. by 5in. air bricks about 9ft. apart. I should add the air bricks on the one side have small conical holes in them, and on the other bar openings.—BOAZ.

[9708].—**Heating Apparatus.**—Can anyone advise me about the best and cheapest system of hot-air apparatus for warming an old house with cellars beneath, where the fire can be placed? Is it practicable to build the whole arrangement in brick and distribute the warmed air in wooden pipes? If it is better to buy a cast-iron stove for warming the air, whose stove is best? I want to heat three rooms 18ft. by 25ft., and a hall 18ft. by 18ft., with a uniformly heated supply of warm fresh air.—F. D.

[9709].—**Belgium.**—Can any correspondent suggest to me a short trip in Belgium, and give particulars as to cost during a ten days' trip?—IOTA.

[9710].—**Sculptor's Wax.**—I would be glad if any reader would give me a receipt for making sculptor's modelling wax, with the exact proportions of the ingredients. An early reply will greatly oblige.—C. L. H., Dublin.

[9711].—**Maps and Plans of Old London.**—Some time back I recollect an exhibition being held (I think at South Kensington) of old maps and plans, showing the development of London and its suburbs. Could any of your numerous readers give me any particulars of same, or any information as to where maps, &c., could be seen, especially dated about 1800?—OLD LONDON.

### REPLIES.

[9698].—**Surveying Instruments.**—It is not absolutely necessary that a surveyor in a small country practice should have a theodolite. But really a good second-hand one may be bought so cheap nowadays that it seems hardly worth while to be without so valuable an adjunct to the equipment of a surveyor. As a saver of time and as an assurance of accuracy, if for surveying only, the theodolite is a great boon; but for inaccessible distances and heights, for setting out curves, &c., it is simply indispensable. I am not one of those who advocate using the theodolite as a level, although in an emergency I have done so. In the absence of a theodolite, a "box-sextant" is an exceedingly serviceable instrument for taking angles, or a prismatic compass, the latter requiring great care in use, especially to avoid metallic attraction. For ordinary practice a good 12in. dumpy level (with compasses attached), staff poles, and ranging rods, 100ft. and 66ft. chains, optical square (not cross-staff), a good plumb-bob, beam compass, circular protractor, and steel straight edge, are the chief desiderata.—GEORGE WM. USILL, A.M.I.C.E., Editor of Merritt's "Land and Engineering Surveying."

St. James's Church, Taxal, has been closed for alterations and improvements to be effected in its interior, from the plans of Mr. Darbyshire, architect, of Manchester, at a cost of £1,000.

### LEGAL INTELLIGENCE.

KAYE AND OTHERS V. CHUBB AND SON'S SAFE AND LOCK COMPANY (LIMITED).—(Before the Lord Chancellor, Lord Watson, Lord FitzGerald, and Lord Macnaghten).—This was an appeal from a decision of the Court of Appeal reversing a judgment of the Queen's Bench Division in an action brought by the appellants against the respondents for the alleged infringement of a patent apparatus for fastening and unfastening doors, gates, lids, and windows. The appellants' and the respondents' door-latches are all made on what is known as the "push and pull" principle—that is to say, the latch is withdrawn from the doorpost, not by turning the door-handle round, but by pulling the inside handle or pushing the outside one. At the trial in November, 1886, Mr. Justice Mathew gave judgment for the appellants; but his decision was reversed by the Court of Appeal, who ordered judgment to be entered for the respondents. At the hearing of the appeal, judgment was postponed. Their Lordships on Tuesday gave judgment, being of opinion that the appellants' invention was valid. Judgment reversed with costs.

PILASTERS AND THE BUILDING ACT.—At Hampstead, Edmund Toms, builder, of Gloucester Works, Wellington-street, Camden-town, has appeared in answer to an adjourned summons taken out by the Hampstead Vestry charging him with having, without the consent in writing of the Metropolitan Board of Works, erected certain structures in advance of the general line of frontage in Church-row and Heath-street. For the defence it was contended that the pilasters came under the description of "window dressings and other like architectural decorations," and that, therefore, the defendant was justified in what he had done. It was also said that this view had been upheld by Mr. Barstow in a similar case at Clerkenwell Police-court, which was now awaiting decision on appeal. The Bench ordered the demolition within six weeks of so much of the building or structure on the Heath-street side as was more than 5½in. in advance of the front wall of the building, and of so much on the Church-row side as was more than 3½in. in advance of the front wall. They also ordered the defendant to pay 20 guineas costs.

CASE UNDER THE EMPLOYERS' LIABILITY ACT.—At the Chester County Court, on Friday, before Judge Horatio Lloyd, judgment was given in a case in which a labourer named Pearson, living in Hoole, Chester, sought to recover £200 from Robert Neill and Sons, builders and contractors. The defendants were the contractors for the erection of a goods station at Chester, and the plaintiff was employed by them. For the purposes of laying foundations, holes had to be dug, and into these holes planks had to be driven. The plaintiff was engaged in one of these holes preparing for the planks, and on the occasion in question he gave the signal to "strike." The man above struck, and in so doing caught a heavy wooden dolly, which fell on the head of the plaintiff, causing serious injuries.—Judgment was given for plaintiff for £70; execution to be stayed for two months if defendants paid the plaintiff £10.

MEMBERS OF LOCAL AUTHORITIES AS CONTRACTORS.—At the Yorkshire Assizes on Saturday, before Mr. Justice A. L. Smith, the case of Nutton v. Wilson was heard. The plaintiff in this action was John Nutton, an excavator and contractor, of Church-street, Elland, and he sued to recover £50 as penalties from the defendant, Joseph Wilson, a joiner and carpenter, of Elland, and a member of the Elland local board, in consequence of the latter having participated in the profits of certain contracts between the board and other persons. The case for the plaintiff was that in September, 1887, and October, 1886, the Elland local board accepted tenders for certain work from two men named Brook and Holdsworth, and that the defendant was employed by Brook and Holdsworth, receiving payment from them in respect of his work, notwithstanding that he was a member of the local board. His Lordship gave judgment for the plaintiff for £50 and costs. Stay of execution was granted, and his Lordship directed judgment to be given for the defendant, with costs, provided Wilson succeeded on appeal.

The purchase and preservation of the Clissold Park is practically secured. This park, in Stoke Newington, covers 53 acres. Towards the purchase fund the Hackney Vestry has voted £5,000 and the Islington Vestry £2,500, while the Ecclesiastical Commissioners have sold the property for £10,000, or £12,000 less than its estimated value as a building site.

The Church of St. Paul, Royton, near Ilminster, is about to be restored at a cost of £5,000. A faculty has been granted to enable the committee to take down the present nave of the church and build a new nave, aisles, vestries, and side chapel.

### PARLIAMENTARY NOTES.

THE NEW POLICE OFFICES ON THE EMBANKMENT.—Mr. Broadhurst asked the Secretary to the Home Department whether the contract for the building for the new police offices on the Embankment had been yet let; and, if so, to whom; and whether the granite and stonework for the building was being prepared by the convicts at Dartmoor and Portland respectively; and, if so, whether that work was done for the Government, or whether the convict labour was hired by contractors, and, if the latter, by what contractors. Mr. Matthews: The contract for this building has been let to Messrs. Grover and Sons. The granite required for the lower portion of the building has been worked by convict labour at Dartmoor. The work is done for the Government, and the Receiver of Police pays all expenses incurred, including delivery on the ground. The contract was concluded on the understanding that all the granite would be delivered free of cost, and the contractor derives no benefit therefrom.

### WATER SUPPLY AND SANITARY MATTERS.

CROYDON.—The new reservoir was inaugurated last week. The water is obtained from a well situate three-quarters of a mile south of Addington village. It is sunk in the chalk to a depth of 200ft., the surface being 318ft. above sea-level. The storage capacity of the headings and the lower part of the well is about 502,000 gallons. A Woolf compound beam-engine raises the water, its delivering power being 77,760 gallons per hour. The reservoir will hold 5,000,000 gallons. Its overflow level is 465ft. above sea-level. The total length of mains laid is about 13½ miles. The district for domestic supply is the area of the borough within a two-mile radius from the town-hall, with about 75,000 people. The works have been carried out under the direction of Mr. T. Walker, borough engineer.

EALING, W.—The ceremony of christening the new storage reservoir of the Grand Junction Waterworks at Ealing took place on Friday. The new reservoir is situated on Mount Park-hill, and will be a reserve to meet any emergency caused by excessive drought, large fires, or other contingencies. Its surface extends over six acres, and, with a depth of 45ft., it will contain 51,000,000 gallons of filtered water. It is lined with Portland cement concrete, and the slopes are paved with vitrified brick. The level of top water is 193½ft. above Ordnance datum, and the water will be supplied from the works at Kew-bridge through a line of pipes 30in. in diameter. Messrs. John Aird and Sons were the contractors, and Mr. A. Fraser was the engineer.

ST. HELENS, LANCs.—The foundation stone of new engine and boiler house for the St. Helens Corporation waterworks was laid on Tuesday week at Kirkby, on the Sefton estate. The two wells close by have been sunk in the pebble beds of the New Red Sandstone formation by Mr. Villiers, contractor, of Beverley. Each is 11ft. in diameter and 150ft. deep, being connected by a heading 9ft. by 6ft., and a borehole sunk at the bottom of one of the wells makes a total depth of 510ft. Messrs. R. Daglish and Co., St. Helens, will supply the pumping engine at a cost of £5,990, and Mr. William Harrison, St. Helens, has put in the engine foundations and boiler seatings at a cost of £1,718. The engine house will take the form of an octagonal castellated tower, rising 80ft. above the ground line, and 48ft. wide each way, with chimney, also octagonal, rising 30ft. higher. The base will be surrounded by a terrace 12ft. high. The structure will be built of stone and brick, the outside being of coursed rubble stones. The boiler house will correspond in style. Messrs. J. and T. Yearsley, St. Helens, have this portion of the work in hand, their tender being £5,880. The whole of the works are being carried out from designs and specifications by Mr. D. M. F. Gaskin, borough water engineer, at a cost of £18,500.

At Outwood, near Wakefield, on Friday, the new south aisle and Gammell Chapel of St. Mary Magdalene, Outwood, was dedicated by the Bishop of Wakefield. The cost of the additions to the church has been £1,600 (including £250 for the chapel). Accommodation is now provided for 600 worshippers, as against 400 before. Mr. J. T. Micklethwaite, F.S.A., Westminster, prepared the designs, and these have been carried out by Mr. John Binks, a local builder.

On Friday Mr. Terry, Local Government Board Inspector, held an inquiry at Deal relative to the application by the town council for permission to borrow £4,000 for the construction of a sea wall at North Deal, and other town improvements. The town clerk supported the application on behalf of the council, and Mr. Worsfold Mowll opposed it, representing the rector and other ratepayers.



## Our Office Table.

THE first report of the committee appointed to investigate the action of light upon water-colours, has just been published as a "Blue-book," and deals with the physical aspect of the inquiry. Practically, the committee find that while many pigments used by the water-colour artists do fade under exposure to light, "a good gamut" of safe colours is still available for use, while the important fact is established that every pigment is permanent when exposed to light *in vacuo*, indicating the direction in which experiments should be made for the preservation of water-colour drawings. The committee find that mineral colours are more stable than vegetable colours; that if moisture and oxygen are excluded from a picture it will not deteriorate from the action of light; and that what destroys a water-colour are the blue and violet rays of the prism. It would take a century in South Kensington very markedly to deteriorate a water-colour. If the sun's rays were excluded and only gas or the electric light used, it would take thousands of years to harm the pictures. And if a yellow glaze were interposed between the sunlight and the picture the risk of fading would be greatly lessened. The most fleeting colours are carmine, crimson lake, purple madder, scarlet lake, Payne's grey, Naples yellow, olive green, indigo, and brown madder. The colours which stand are yellow ochre, Indian red, Venetian red, burnt sienna, chrome red, lemon yellow, raw sienna, terra verte, chromium oxide, Prussian blue, cobalt, French blue, and ultramarine ash. Prussian blue has a peculiar quality. It fades into green after exposure to strong light, but is restored by being placed for a time in the dark.

SIR ROBERT RAWLINSON makes in Wednesday's *Times* another protest against the precipitation and deodorisation works now being carried out by the Metropolitan Board of Works at the sewage outfalls. He remarks that many years since the members of the Board were informed by the most eminent chemists that no chemicals purified sewage; that the best left seven-eighths of the salts of sewage in the clarified water, *plus* some of the chemicals; and that the clarified fluid, when passed into small streams or rivers, would ferment, become putrid and offensive—these being the results, whatever chemicals or precipitants were used. He predicts that the fifty cases of sewage tanks and works will prove intolerable, that the river barges will be costly incumbrances to the river, and that the working expenses will be enormous, and all waste. Sir Robert reiterates his well-known views that in broad irrigation will be found the solution of the problem of dealing with the metropolitan sewage.

In their thirty-first annual report, just issued, the Trustees of the National Portrait Gallery state that three portraits were purchased during the year, those of Lieut.-General Sir James Hope Grant, 1806-1876, by Sir Francis Grant, P.R.A.; Mrs. Sarah Trimmer, 1741-1810, educational writer, painted by Henry Howard, R.A.; and Admiral Sir Cloudesley Shovel, 1650-1707, painted by Michael Dahl. The purchases made now reach a total of 420 since the collection was formed. An important alteration of name in one of the principal pictures has recently been made. A portrait, formerly in the possession of Mr. Fraser Tytler, and described as a portrait of Mary Queen of Scots, has been found to be a portrait of her mother, Mary of Lorraine. The manner in which the arms of France and Scotland are quartered clearly indicate the date, 1560, when Francis II. and Mary ruled in France, and Mary of Lorraine was Regent of Scotland. The picture would appear to have been painted whilst the Regent was besieged in Leith, and the distant city and castle among rocks would be intended for Edinburgh. Another picture, presented in May, 1877, as a portrait of Sir Randolph Crewe, has since been proved to represent Sir John Bramston, an eminent Judge, painted by Daniel Mytens. Several pictures have been cleaned and lined, others have been cleaned, and seven portraits have been put under glass.

At the last meeting of the Stockport town council a heated discussion took place with

reference to the receipts and duties of the borough surveyor, Mr. A. M. Fowler. Mr. Williamson, who raised the question by a resolution, said that Mr. Fowler was appointed in 1884 at a fixed salary of £100 a year and a commission of 5 per cent. on extra works. This commission had amounted during the past two years to £838. Inconvenience had arisen from the fact that Mr. Fowler was allowed to continue private practice at Manchester, and he urged that it would be more economical and satisfactory to employ the whole time of the borough surveyor, and pay him an inclusive salary. Col. McClure pointed out that Mr. Fowler's charges were less than those of an outside architect or engineer, and eventually the whole subject of the borough surveyorship was referred to the committee with instructions to report back to the council.

THE system of registration of plumbers instituted by the Worshipful Company of Plumbers, London, has just been introduced into Manchester through the instrumentality of the Manchester and Salford Sanitary Association, and is now fully organised. The local council, of which Mr. John Holden, F.R.I.B.A., is chairman, and Mr. Fred Scott, secretary, consists of representatives in equal numbers of the public, master plumbers, and operative plumbers. The representatives of the public, appointed at a public meeting in the Town Hall, include the Mayors of Manchester and Salford, the chairmen of the Health Committees, city and borough engineers, medical officers of health, the chairman and secretary of the Sanitary Association, architects, builders, and sanitary engineers. The masters and operatives also in public meeting selected their own representatives. The council will carry out the work of registration in Manchester and Salford and a district of about 30 miles radius, except on the Liverpool side, where the district will extend only to Warrington. At the last meeting of the local council the first batch of applications were passed for nomination in the Plumbers' Company.

In an interim report just issued the Select Committee on Town Holdings explain that it is not in their power to complete the whole of their inquiry this season. They add:—"Your committee hope that it may not be necessary for them to call further witnesses as to the terms of occupation and the compensation for improvements possessed by the occupiers of town houses and holdings in Great Britain and Ireland, or as to the expediency of giving to leaseholders facilities for the purchase of the fee simple of their property; but they desire to take further evidence upon the question of imposing a direct assessment on the owners of ground-rents, and on the owners of increased values imparted to land by building operations or other improvements. They accordingly recommend that the committee be re-appointed next Session for the purpose of receiving such additional evidence as they may think necessary, and also of reporting upon the several branches of the inquiry."

### CHIPS.

A block of buildings just erected at Carnforth for the Co-operative Society were opened on Saturday last. The block consists of a public hall, capable of accommodating between 500 and 600, with a gallery, ante-room, two-stalled stable, cart-house, three-storied warehouse, and three large shops, in which the grocery, provision, drapery, and boot and shoe trade will be carried on. The hall is the largest public room in the town. Mr. Robert Walker, M.S.A., of Windermere, was the architect, and the cost has been £2,500.

Building operations have just been commenced for the new schools adjoining the church erected at Monton Green, near Manchester, some years since. The building will be faced with stone parpoints and Darleydale ashlar, and will contain large school and classrooms on ground floor, with meeting-room 64ft. by 32ft. on first floor, and social rooms for the use of the congregation. The architects are Messrs. Thos. Worthington and J. G. Elgood, Lombard-chambers, 46, Brown-street, Manchester; and Messrs. Southern and Sons, the general contractors.

Alterations have been made at the Castlegate Ward Liberal Club, York, embracing the ventilation, which is now carried out on the Boyle system, the latest improved form of the self-acting air-pump ventilator being adopted for the extraction of the vitiated air.

## MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Clerks of Works Association. Paper by T. Gamage, Carpenters' Hall, E.C. 3 p.m.

## Trade News.

### WAGES MOVEMENTS.

DUNDEE.—At a meeting of joiners held in Dundee on Friday night the wages question was discussed, and a resolution was unanimously adopted declaring that the present state of the joiner trade in Dundee warrants an advance on the rate of wages, and that the meeting was of opinion that an immediate demand be made for a rise of 3d. per hour to all men who are paid under 63d., and that all others be raised to the standard of 7d.

A new reading-room has just been added to the Free Library at Chester, at the sole cost of the mayor of that city. Mr. Thomas M. Lockwood, of Chester, was the architect. The public opening took place on Friday.

At Friday's meeting of the Metropolitan Board of Works, a memorial from the vestry of St. Nicholas, Deptford, praying the Board to provide a small class of dwellings for the working classes of Deptford instead of the great blocks of labourers' dwellings now being erected under the Artisans' Dwellings Act, was presented by deputation, and was referred to the Works and General Purposes Committee.

A statue of Earl Shaftesbury has been completed by Mr. J. E. Boehm, R.A., at a cost to the donors of £2,000, for erection in Westminster Abbey, but remains at present in the sculptor's studio until additional subscriptions have been raised to meet the fees demanded by the Dean and Chapter. £400 was originally claimed on this account, but this was reduced on the representation of the committee to £250. It is satisfactory to learn that this fee will not go to the clergy, but be carried to the fund for the repair of the Abbey fabric. In addition to the statue, the committee have commissioned Mr. Alfred Gilbert, A.R.A., to execute a memorial in bronze to be erected in Shaftesbury-avenue or Piccadilly-circus.

The work of restoration of the priory church of Old Malton is proceeding under the direction of Mr. Temple Moore, F.S.A. About ten years ago the lay rector, Earl Fitzwilliam, spent £3,000 on the restoration of the tower and south walls, and the present works are being carried out by a committee of subscribers.

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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1754.

FRIDAY, AUGUST 17, 1888.

## THE LIABILITY OF THE QUANTITY SURVEYOR TO THE CONTRACTOR.

THE very important case of "Priestley and Gurney v. Stone" has now been decided in the Court of Appeal, as we reported (August 3), and the judgment of Mr. Justice Stephen, upon which we commented at the time (January 27), has been unanimously affirmed. So far, then, the law is settled, for though, of course, there may be an appeal to the House of Lords, we much doubt whether that body could be induced to vary the view taken by the Court of Appeal in their application of well-known legal principles to the facts of this case. We still maintain that the decision is not in accordance with custom or with common sense. But as the law stands, it becomes a question whether it would not be better for contractors and others so to alter their custom as to bring the pressure of legal liability to bear upon negligent quantity surveyors. It will be well worth while for us to recapitulate the facts of this case before dealing with the legal points and arguments involved, and before drawing from the whole that moral which we think it teaches.

The action was brought by the plaintiffs, builders, against the defendant, a quantity surveyor. A Catholic priest being about to build a church at Chiswick employed one Kelly, an architect, to draw plans for the purpose. Kelly did his part of the work, and then instructed the defendant, a quantity surveyor, to take out the quantities according to his plans. The defendant accordingly prepared a bill of quantities, had a number of copies photographed and handed them to Kelly, who thereupon applied for tenders. The plaintiffs, amongst others, tendered for the building, and their tender was accepted. The plaintiffs paid the usual fee on obtaining the quantities at the architect's office, and it was understood, as usual, that the successful builder should pay the surveyor's commission out of the first instalment due under the contract. This was quite according to the regular course of such transactions, and this it is which makes the case of such wide-spread interest and importance. The plaintiffs soon found that the quantities were very deficient, and they refused to pay the defendant the price of his commission unless he undertook to make good these deficiencies, and on his refusal they brought this action. The plaintiffs claimed damages for injury caused by the negligence and breach of duty of the defendant as quantity surveyor in preparing an inaccurate bill of quantities. They based their claim upon the grounds that the defendant, in preparing the bill of quantities, represented that the same was correct, and would be sufficient for the building of the church according to the plans; and, further, that it was the duty of the defendant, as such surveyor, to use ordinary care and skill in the preparation of the quantities, knowing that tenders were made and contracts entered into on the faith of their accuracy. In his defence the defendant denied that he was negligent, and said that there was no privity of contract between him and the plaintiffs, and that he did not owe any duty to the plaintiffs. He further maintained that there was any inaccuracy in the quantities, and alleged that the plans were altered after the quantities had been prepared, and he also counter-claimed the price of his commission. At the trial Mr. Justice Stephen, judgment was given for the defendant in the action, and

upon his counter-claim and upon appeal the Master of the Rolls and Lords Justices Lindley and Bowen—a very strong Court—agreed in confirming this decision. The argument for the plaintiffs was, in effect, that they had made their tender in good faith, relying upon the implied representation in the defendant's bill of quantities that they were accurate, whereas they were inaccurate through his negligence, and so he should be liable in damages for misleading them and causing them to suffer loss. Plaintiffs' counsel referred to "Scrivener v. Pask" in support of his contention; but that decision only proved that the building owner could not be made liable for inaccurate quantities, even when his own architect prepared them. It is true that, in his judgment upon that case, Mr. Justice Blackburn said, "If there has been misconduct on the part of the quantity surveyor, the plaintiffs have their remedy against him." But the point of this observation in its legal aspect lies in the word "misconduct." Undoubtedly, if there had been any fraud or fraudulent misrepresentation, or if there had been such recklessness as amounted to that, then there would have been "misconduct" in this sense—and, as Lord Justice Bowen intimated, the defendant might have been liable. However, the plaintiff's claim was not based upon fraud of any kind, but only upon the defendant's negligence in doing his work, so that it could only be founded either upon a breach of contract or a breach of duty on his part. The result of the judgment upon appeal is to hold that there is no contract between a quantity surveyor and a contractor, and that the former owes no duty to the latter, so that the only two bases upon which the plaintiffs' claim could be built up were taken away. The case of "Scrivener v. Pask" decided that the builder has no remedy against the owner for defective quantities: the case under comment now declares that he has no right of action against the surveyor; and thus, as the law stands, builders have no redress anywhere for loss upon deficient quantities, and they must, as far as the law goes, accept tenders at their peril, unless some change is made in the existing methods of doing business.

The judgments in the Courts of Appeal are, from a legal aspect, hard to answer. The Master of the Rolls laid it down that the contract as to taking out the quantities was made between the architect and the surveyor, and not with the builders. The surveyor was employed only and solely by the architect, and dealt with no one else. He handed in his quantities to the architect, who could check them, or alter them, or alter his own plans before sending them to the builders. If there were any such alteration it would be hard to make the surveyor liable to builders for any loss they might incur. Lord Justice Lindley based his judgment upon the absence of any "privity of contract" between builders and quantity surveyors; but this phrase, "privity of contract," is a legal theory much broken in upon lately. The real question at issue was only dealt with at once boldly and broadly by Lord Justice Bowen. In his view there was no privity of contract between plaintiff and defendant, and no duty owing from the defendant to the plaintiff, upon which any legal liability could be founded. The best point in the plaintiff's case was that the defendant made a statement as to quantities, which he knew would be passed on to other persons, and as he was liable for that statement being inaccurate. But he only made that statement upon his own belief, and he either believed, or did not believe, in the truth. If he did, then there could be no liability; and if he did not, then it was fraudulent, and he could be held responsible if sued in an action grounded on this fraud.

According to Lord Justice Bowen, a quantity surveyor is bound to use care about his work; but he makes no representation that he has used such care upon which he could be made liable to parties with whom he has no sort of contract. Even assuming the defendant was negligent, that would not render him responsible to the plaintiffs, as builders, unless the negligence was so reckless as to amount to fraudulent misrepresentation, of which there was no evidence, and which had not been set out as the plaintiffs' ground of action for damages.

The Court of Appeal have, therefore, now decided that there is no privity of contract between a quantity surveyor (employed by the architect of a building) and a builder tendering for the construction of the building, so as to enable the builder to sue the surveyor for negligence or breach of contract in preparing inaccurate bills of quantities. They have further decided that the relation of quantity surveyor to builder does not imply that the former owes any such duty to the latter in preparing a bill of quantities as would bring about the same liability for damages that would flow from privity of contract between them. The second point is the more important, for it could not be contended that there was any privity of contract based upon what is generally understood by a contract; but there is much to be said in support of the argument that a surveyor who prepares quantities owes a duty to every builder who may *bonâ fide* tender upon the faith of their being accurate. The Court of Appeal have, however, decided that there is no such duty, and they have absolved the surveyor from all liability to builders who may lose by his negligence and inaccuracy as to quantities, unless these can be shown to be so gross and reckless as to become fraudulent in the eye of the law. To prove that would be practically impossible, and so the question arises whether a legal liability cannot be obtained by such a modification in the existing method of doing business as may insure privity of contract amongst all parties.

The shortest and the simplest way to bring about this desirable result is to incorporate the quantities, by reference or otherwise, in the contract made between owner and builder. If this were done all parties concerned would be liable one to another, and reasonable accuracy would be pretty well certain of being employed. Presuming a contract to cover the quantities, the building owner would in law make himself liable for any loss to the builder arising from their deficiency. If such a loss occurred, he would in his turn look to his architect to be protected, who in his turn would come down upon the quantity surveyor whom he had employed for compensation. As between architect and surveyor, there would be a clear contract, upon which the latter would be liable for any inaccuracy in doing the work which he was engaged to perform. The architect would be equally clearly liable to the building owner, and on the contract for the actual building the owner would become responsible to the builder for the accuracy of the quantities therein referred to or contained. In this way owners would take care to employ architects who could be trusted to engage competent quantity surveyors, and so the chain of legal liability would be strongly made up of the several well-defined links of mutual and contractual liability between the various parties engaged in the transaction, and there would be no need to base claims for damages upon inferential arguments as to duties owing from one to another. It would have been better and more in accordance with the custom of the profession if the Court had adopted the view that the quantity surveyor practically contracts with the builder, from whom he receives his commission, that his bill of quantities is fairly accurate, and is not, at all events, misleading when used as the



basis of a tender. But as the courts of law will not accept this short cut to the liability of quantity surveyors, and as they must, in the interest of everyone, be made liable for bad work somehow or other, it seems obvious that the only remedy lies in the roundabout method above described. Make the bill of quantities a part of the contract between owner and builder, and then the rights and remedies of all parties will flow naturally from their legal relations between each other.

[After the above was in type we received the letter from one of the learned counsel in the case which will be found in another column. That communication confirms all that we have said, and supports our view that the best and most logical remedy lies in making quantities a part of the building contract; while it also contains another suggestion for the creation of a new contract between builder and quantity surveyor which would do, perhaps, as well, but is not so likely to be adopted, we consider.]

### HALLS AND STAIRCASES.—III.

**B**EFORE proceeding to suggest other arrangements of halls and staircases, it is necessary to say something of planning winding stairs, now so commonly introduced for saving space. Architects, when they draw in their stairs, seldom take the trouble to equalise the width of the treads as much as possible along a given "tread-line," or distance from the handrail, a line which is generally assumed to be about 18 in. from the handrail. Unless this line of travel is taken as the setting-out line for the risers, the treads will be of a different width on the winders to those of the straight flight, causing persons to stumble going up or down stairs. The error is in making the risers of the straight flight terminate at the springing of cylinders, the result of which is that the treads of winders are unduly narrowed just where the feet travel in ascending or descending. By confining the winders to the quarter circle the transition from the flyers to the winders becomes abrupt. To obviate this, two or more of the flyers should be made winders, so as to graduate their width. For the sake of convenience, also, it is necessary to increase the width of the stairs at the winders a few inches, by which a very considerable degree of ease is secured at the turnings, admitting of the readier removal of furniture. Let us take a one-quarter space winding staircase, such as is often seen in small dwellings (Fig. 1). The walls of staircase are set out first, determined by the number of risers. We assume a 3 ft.-wide staircase with 10 in. cylinders and, allowing a 3 ft. passage-way, the total width between walls may be taken at 7 ft. Drawing in the tread-line and the starting and landing risers, the other risers are divided between them with an equal width of tread, the division being made to give equal spaces round the cylinders as shown in our plan, observing particularly that the width of tread at the line of travel round the cylinders corresponds with that in the straight part of the flight. Nothing is more important than the grading of winders round the cylinder, both for easy ascent as well as to give an agreeable curve to the wreath of handrail and string, and to avoid a sudden ungraceful twist. We do not, however, recommend this plan as a model; a quarter landing is infinitely preferable, and it may be obtained by a few extra inches in the "going" of the stairs. Sometimes by curving the risers into the cylinder winders may be avoided, and a reduced quarter-landing obtained when the cylinder is small. The starting or commencement of a flight is one other point of vital importance in the design of a flight. Nothing looks meaner or less inviting than a long, narrow flight commencing with straight steps and a small curtain or scroll at the bottom. A more

elegant and inviting arrangement is to curve the risers of the first three or four steps, as shown in Fig. 2. This plan is especially convenient when the space at the foot of stairs is contracted. More attention to these points in the planning of stairs will frequently be the means of saving valuable space, and in conducting to a comfortable staircase. We may be told these suggestions are not in accordance with Old English models. Perhaps they are not. The conditions of modern staircase planning are not the same. Space has now to be saved; beyond which the Old English model does not agree with the spirit of Classical architecture, or the adaptation of modern scientific stair planning to artistic design. Architecture in these matters ought

Fig 1

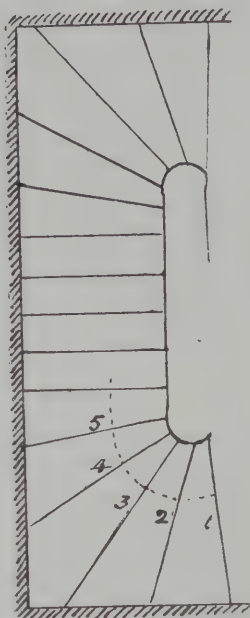
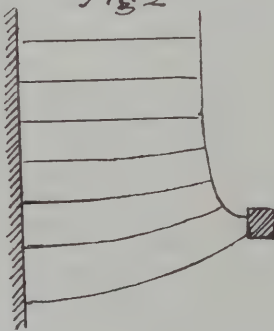


Fig 2

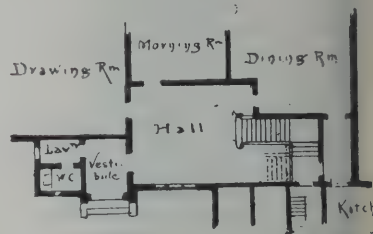


to be the outgrowth of advanced science and artistic discernment, and until it attains to that position it falls short of its true meaning.

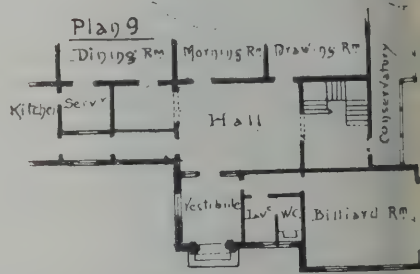
We must again caution the student against fitting a stair to a given space, as if any tread and riser can go together. Anyone who has ascended a flight in which the grade is not in accordance with the formula we have given (page 66) must have experienced a sense of fatigue and exertion. For instance, a staircase with steps having a 9 in. tread and a  $7\frac{3}{4}$  in. rise is awkward, the riser being  $\frac{1}{2}$  in. more than it ought to be by Blondel's rule. The ordinary plan is to divide the height of story—from floor to floor level—into any number of parts that can be got within the length of flight; the latter length, or "going," as it is called, deducting landing, is next divided into treads, the number of which is always one less than the number of risers in the flight. The proper and scientific method is, as we have pointed out, to adopt an easy step-proportion of rise to tread, and adjust the walls to the length of run.

Continuous flights ought to be limited to twelve or fifteen steps, the shorter the better, and a width of 3 ft. is the least for two persons passing. A width of 4 ft. is sufficient for a house of moderate pretensions. For public buildings, staircases of 5 ft., 8 ft., and 10 ft. are necessary. The plans we now give show the side hall and staircase suitable for residences of a superior class; in the two first plans the hall is made an important feature, well lighted by windows in front at the side. Plan 8 exhibits an arrangement of house in which the principal reception rooms are placed towards the south-east, and the hall and entrance in the opposite or north-west front—a distribution of plan that gives a very desirable location of rooms and offices in this climate. Architects frequently fall into the mistake of thinking the entrance must be on the main front. Such a plan, of course, may be necessary in the

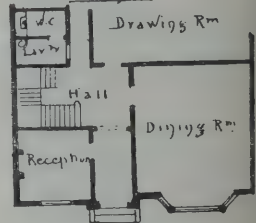
Plan 8



Plan 9



Plan 10



planning of town houses and public buildings, but in a large private residence in its own grounds the front entrance entails so serious drawbacks. It encroaches on the chief reception-rooms in front and it destroys their privacy. Visitors, in approaching the entrance, pass near to, or can look straight into, the windows of those apartments, and we can imagine the *contretemps*, unpleasant, sometimes embarrassing, to visitors and others occupying the rooms. A side entrance is out of the way, visitors and guests are brought together in an inopportune moment and are removed from the critical gaze of the occupants of the rooms. The first flight of the stairs in this plan can be brought with curved steps into the hall, and made central. The kitchen and other rooms are on the north-west front, and a convenient communication by means of a passage or serving room between the kitchen and the dining-room. In Plan 10 the hall is a large apartment lighted through the staircase hall on one side, which communicates with a conservatory running along the south front, and having an opening into the drawing-room. On the north side of large hall is a con-



ving direct access from the entrance vestibule into a lavatory, and at the end into a billiard room, with the conveniences attached thereto, and the whole can be shut off by a door from the main hall. The dining-room is in connection with the kitchen offices, having an entrance therefrom and also from the hall. The first-floor plan has a gallery round the hall, the rooms being set back. The last plan, 10, shows an arrangement for a smaller house, with the hall lighted at the side. Conveniently placed is a reception room, entered from the vestibule, and the usual conveniences are on the farther side of the staircase. The plan has the merit of being concentrated; the stairs are out of sight of visitors entering the vestibule, yet of sufficient size and importance to give dignity to the hall. In the first two arrangements the stairs can be made to form a part of the hall or be screened off from it. In Plan 9 the separation could be made by two columns with attached pilasters, if the design was Italian, or by an arcade of three arches, a treatment that would allow ample light to enter the hall through the conservatory. Ingenuity can suggest many very charming arrangements by which the hall or vestibule can be connected to the conservatory or plant house, and we shall show a few of these combinations as we proceed.

#### THE STORAGE OF RAINFALL.—BUILDING BASEMENTS AND LEVELS.

THE recent disastrous floods which have taken place in many of the low-lying districts of the metropolis and elsewhere have shown the futility of depending on the existing arrangements for carrying off the surplus water during very heavy and continued rains. Whenever we have a rainfall that is above the average, the inadequate capacity of the conduits is proved beyond any doubt. A week or two ago we had reports of basements of houses at Hackney, Poplar, the Isle of Dogs, Kennington, Peckham, and other parts, having been flooded by water, or, rather, a dilution of sewage. In many houses which have basements or underground rooms, the gullies intended for their drainage were literally found to be disgorging their contents and discharging the liquid portion of the drains into the dwellings. Even outside grated openings were in some cases converted into fountains of dirty water. The attempts made to stop the flow only rendered matters worse. In vain people applied to the vestries and district boards—the grievance had to be endured, and furniture removed from the underground rooms.

We do not propose now to enter into the various questions more or less concerned in these periodical devastations further than to remark that too much confidence is placed in a system of drainage which, however perfect it may have been in its inception and day, is now quite inadequate to meet the ever-increasing area of buildings. As land comes to be covered by houses and paved streets and yards, so the quantity of rainfall to be got rid of by the drains is increased. On paved and roofed surfaces where percolation cannot take place the rain collects in masses and forces its way with redoubled energy down the pipes and drains into the sewers. The latter have been designed to carry off the ordinary house drainage of a certain area, and, in the majority of cases, are unprepared to discharge storm-water quickly enough to prevent overflow. The occurrence of last month is not exceptional. In April, 1878, a heavy rainfall took place, which was registered as 2in. in London streets in about 19 hours. The main drainage system was found inadequate to meet the emergency. The south of London suffered immensely, and the Effra

sewer burst. The question of rainfall discharge was mooted at the time, but has become more urgent since. The original report on the main sewers stated that they were of capacity sufficient to carry off all flood waters—that is to say, the storm water would be intercepted from the low-lying districts on the south of the Thames. They may have been so then, but their capacities are unduly taxed by the more rapid discharge of storm waters from the higher districts around, which are now built over. The metropolitan sewers were designed to provide for an arbitrary quantity of rainfall, amounting to a fraction of that which is known to fall, or, we believe, to about 0.25in. in 24 hours. For this purpose they were doubled in area. It would add enormously to the cost of sewerage a town if the sewers were made large enough to hold the storm-waters during rainfalls such as we have had; it has indeed been calculated that something like sixteen times the area necessary for ordinary sewage would have to be provided. Sir J. Bazalgette very wisely, in order to carry off excessive thunderstorms, constructed overflow weirs, a very large one of the sort having been recently constructed at Deptford. These act as safety valves during severe rainfalls, and have been placed at the junctions of the intercepting sewers and the main valley lines. Notwithstanding these safeguards, we are threatened with floods forcing their way into basements and cellars at every heavy storm.

From these facts we infer that other measures ought to be carried out. There are only two ways: either to supplement the present system of sewers by conduits or channels in the roadways, or by specially constructed storm-water reservoirs or sewers; or to raise the basements of buildings in the low-lying areas above flood level. The idea of making reservoir sewers has now been generally abandoned by engineers, who prefer the separate system. Unfortunately, that system has been very imperfectly carried out owing to the patchwork way in which our towns have been sewered. Between advocacy of the two systems the storm waters have been allowed to look after themselves. But their provision cannot be put off any longer. Our great towns suffer more now than they did in former years. The allowance made by engineers to double the area necessary for ordinary contingencies is quite inadequate, and will yearly become more so. Taking London, as we have hinted, the engineers concluded that  $\frac{1}{2}$ in. of rain in 24 hours was the greatest quantity that fell on the average, and that this amount did not contribute more than one-eighth or one-half to the sewers. The overflow weirs which are in the valleys or occupy the old channels into the Thames have saved large neighbourhoods from floods, but even they are insufficient to prevent the flooding of basements. It is chimerical to think of other modes of storing or discharging storm waters in London. We are therefore driven to the second measure to keep out of harm's way, by making it compulsory to build houses at a higher level in the lower districts, and to omit the construction of underground rooms and basements. After the shocking revelations that have been published respecting the submersion of houses at Poplar and other parts, the legislature should frame regulations to restrict the construction of dwellings with basements in every locality where experience has shown that an exceptional rainfall has been productive of danger to health. Even the ordinary London half-basement in clay soils, or basins surrounded by hills or higher land, is sometimes inundated, rendering it necessary to ascend a story higher whenever there is a heavy storm. We have always advocated their disuse, as being an undesirable mode of increasing

accommodation. The problem of the discharge of rain from roofs and paved surfaces is an important one in towns. How can some of the water be stored, and so diminish the discharge? We may imagine what a difference in the amount which finds its way into the sewers would be made if every house in a town had a rain-water storage tank large enough to contain, say, a quarter of a cubic foot of water for each square foot of roof area. The roof of an ordinary house receives at least 1,000 cubic feet of rainwater annually, and we have it on Mr. Symons' authority that if all the water falling on a roof could be collected a rainfall of 20in. would give 93gals. per square yard per annum. The architect has it within his power to regulate and control the amount which passes away and is wasted, only to flood adjacent low districts; he can bring into requisition the useful rainwater "separator," which enables a proportion of the water to be stored and the remainder to be used as a natural cleansing agent. The engineer has now to deal with large slated and paved areas over which the rain rapidly passes in great volumes to augment the already large amount of sewage. He can allow little for evaporation or percolation under these circumstances. Future sanitary and building legislation might profitably be directed to a mitigation of the evils in several ways. The sanitary authority ought to have the power to decline to pass plans of dwellings to be built on sites which cannot be easily drained or which have cellars. Those buildings which are so placed ought to be protected by valves to prevent floods entering. All areas liable to be flooded should be raised or protected by embankments; storm-water channels or drains should be provided in the streets, and all valley lines and natural streams should be maintained and improved where necessary to assist in the carrying off of storm-water. Rain-water tanks should be required to every house and over a certain area. If these several regulations were carried into operation we might be spared a repetition of the calamities which have lately visited Poplar and various other parts of the Metropolis.

#### PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—VI.

By HENRY LOVEGROVE, F.S.I., Surveyor.

##### CARPENTER.—NOTES.

THE work of the carpenter is connected with the carcass of the building, and the joiner with the finishings. Some affirm that the carpenter does not use a plane, while a joiner is constantly using one, which is not strictly true, as roof timbers and floor timbers are often wrought.

Measure the timber in the roofs and floors as cube, unless under 3in. square, when it should be measured by the foot run, and when under 2in. thick by the foot superficial.

The following selections from the dimensions will explain better than mere directions how the various portions of the work should be taken; the specification, dimensions, abstract and bill explain each other.

58. *Roofs*.—Frame the roofs as shown on sections, the rafters to be in one length, notched and spiked down to plate; trim for chimney shafts. Put lin. deal gutter and valley boards and bearers to chimneys and other gutters. The rafters  $4\frac{1}{2}$ in. by  $2\frac{1}{2}$ in., collars 5in. by  $2\frac{1}{2}$ in., hips and valleys 9in. by 3in. ridge.
59. *Ceiling Joists*.—The ceiling joists to be  $4\frac{1}{2}$ in. by 2in., and all roofs are to have the necessary tilting fillets and beaded fascias at eaves.
60. *Dormer*.—Form the dormer in roof, as shown, with 4in. by 4in. head sill and posts, the gable to be filled in with 4in. by 2in. studs, and the cheeks to be covered with lin. close jointed boarding for lead.







Sup. planing on fir.			
22	10	2507	6 Ddt.
28	4	122	6 104 8
49	2	2690	0 15 5
		120	1 120 1
		2569	11
3/4 in. wrot and beaded lining to			
45	0	lin. close-jointed bfg. for lead to cheeks of dormers.	
	11	3 Ddt. Do. and firrings for lead.	
	6	0 3 0 41 7	
	17	3	
	3	0	
	14	3	
1 in. wrot and beaded eaves fascia.			
62	9	lin. sound boarding between joists to receive concrete and 5 in. by lin. fillets spiked to sides of joists.	
	171	0 Inodorous felt and allow for laps.	
		2567 6 Ddt.	
		122 6 104 8	
		2690 0 15 5	
		120 1 120 1	
		2569 11	
Run labour rounded edge on lin.			
4	9	Raking, cutting, and waste on lin. close-jointed boarding.	
	7	3 Outing and waste on 3/4 in. roof boarding, both	
	5	0 edges measured (for hips and valleys).	
12	3	179 6 Plugging walls.	
		112 6 5 0	
		9 0 5 0	
		16 6 19 0	
		317 6 5 6	
		84 6	
Deal tilting fillet.			
125	6	Deal feather-edged springer.	
	4	0 Deal narrow chimney gutter.	
	4	0 4 9	
	3	9	
	11	3	
	7	0	
	4	0	
	34	0	
2 in. deal rounded roll.			
8	9	Splayed end to do:	
	1	Herringbone strutting to 10 in. joists.	
		116 0	
		92 0	
		208 0	
Numbers.			
Ends 4 1/2 in. by 2 in. wrot and cut.			
89	Do. 9 by 3	do.	
3	Fir framed bridging joists.		
12	Wright's fixing blocks.		
Total, 29 5/6 dozen.			

CARPENTER.

All timber to be sawn die square and to hold the scantlings figured or described, for which no allowance has been made in the following quantities:—

Squares. Ft.		£ s. d.
1	80 Supl. centring and struts to vaults...	
	42 Supl. do. do. to scg-	
	mental apertures.....	
92	Supl. do. do. to semi-	
	circular do.....	
49	Supl. do. do. to ellip-	
	tical do.....	
7	Supl. do. to bull's-eye .....	
60	Supl. do. to trimmers .....	
23	Run. do. and struts to seg-	
	mental arch 4 1/2 in. soffit	
25	Run. do. do. do. semicir-	
	cular do. do. ....	
8	Run. centring and struts to semi-	
	stone arch, 4 1/2 in. soffit .....	
18	Run. do. do. do.	
	do. 9 in. do. ....	
	No. 1 notch in do for key-	
	stone .....	
41	Run. turning piece to 4 1/2 in. soffit ...	
11	Run. do. do. to 9 in. do. ....	
103	Cube. Fir in wall plates and lintels	
83	Cube. Do. in ground joists and	
	sleepers .....	
1063	Cube. Do. framed in roofs, floors,	
	and partitions .....	
49	Supl. labour planing on fir .....	
70	Supl. 3/4 in. deal boarding on roof.....	
45	Supl. 3/4 in. do. wrought and beaded	
	lining .....	
14	Supl. lin. do. close-jointed boarding	
	for lead to cheeks of dormers .....	
42	Supl. lin. do. do. and firrings on	
	flat .....	
63	Supl. lin. do. wrought and beaded	
	eaves fascia .....	
1	70 Supl. lin. do. sound boarding	
	between joists to receive concrete	
	and 5 in. and 6 in. fillets .....	
25	70 Supl. inodorous felt, and allow for	
	waste and laps.....	
	5 Run labour to rounded edge on lin.	
318	Run raking, cutting, and waste on	
	3/4 in. roof boarding for hips and	
	valleys (both edges measured).....	
	12 Run do. do. and do. on lin.	
	close-jointed boarding .....	
	35 Run Plugging walls .....	
	126 Run deal tilting fillet.....	
	34 Run do. feather-edged springer .....	
	5 Run do. narrow chimney gutter.....	
	9 Run 2 in. deal rounded roll No. 1	
	splayed end to do.....	
208	Run 2 in. x 2 in. herring-bone strut-	
	ting to 10 in. joists .....	

No.		£ s. d.
89	Ends of 4 1/2 in. x 2 in. fir cut and	
	wrought .....	
3	do. 9 in. and 3 in. do. do.	
12	Fir-framed bridging joists .....	
30	Dozen Wright's fixing blocks and	
	building in.....	
Carried to summary ...		

STRAINS.—III.\*

By G. A. T. MIDDLETON.

FLANGE STRAINS.

IN addition to the shearing stress which is calculated to be borne by the web, the flanges of flanged structures have to bear direct tensile and compressile strains.

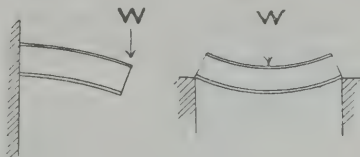


Fig. 13.

This is evident, as shown at Fig. 13, for a cantilever tends to bend under a load so as to place the lower flange in compression and the upper in tension, while a beam tends to bend in such a way as to place the lower flange in tension and the upper in compression. It will be found upon investigation that in any vertical section the tension in the one flange is equal to the compression in the other, and that there is a line along the web at approximately half its depth (if the girder be properly designed), known as the neutral axis, where there is no strain. In practice it is usual to consider that the whole of the tension and compression is borne by the flanges, and that the web has only to be made sufficiently strong to resist the shear.

In order to ascertain the strains in the flanges, it is first necessary to assume the length (or span)  $l$ , and the depth  $d$ . The exigencies of the particular case under discussion will generally determine  $l$ , while  $d$  is usually assumed as some fraction of  $l$ , varying, as circumstances will permit, from 1-12th to 1-20th. These being given, the remainder is a matter of leverage. The double line in Fig. 14 shows

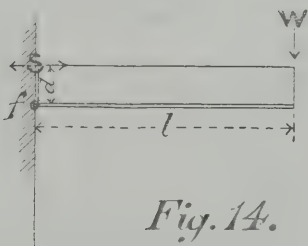


Fig. 14.

the bent lever set in action by the weight  $W$ , at the end of a cantilever, causing the tensional strain  $S$  in the top flange at the point nearest the support—where the strain is greatest. The fulcrum of this bent lever may be assumed at  $f$ , provided that the neutral axis be through the centre of the web, and round this point moments must be taken. The moment  $S \times d$  must, to produce equilibrium, be equal to the moment  $W \times l$ , generally known as the bending moment. These can be equated thus—

$$S \times d = W \times l$$

or, dividing both sides by  $d$ —

$$S = \frac{W \times l}{d}$$

Of course, in the above it is necessary that whatever units be adopted for  $l$  and  $W$ , the same units must be adopted for  $d$  and  $S$  respectively. That is, if  $l$  be taken in inches,  $d$  must be taken in inches also; and if  $W$  be taken in tons, the strain  $S$  will also be ascertained in tons.

If the strain be wanted at any intermediate

spot it can be ascertained, as shown in Fig. 15, by assuming a bent lever round the fulcrum  $f$ , and taking the strain and bending moment's round  $f$ . Then—

$$S' \times d = W \times l'$$

or—

$$S' = \frac{W \times l'}{d}$$

As  $l'$  (Fig. 15) is less than  $l$  (Fig. 14), therefore  $S'$  is less than  $S$ . This proves that the

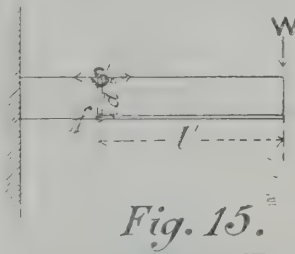


Fig. 15.

greatest strain is at the support. Under the weight,  $l$  is reduced to  $nil$ , when the strain also become  $nil$ , and the value of  $S$  will be found to vary uniformly from  $nil$  under the load to its greatest value at the support. The value of  $S$  will be the same whether it represent the tension in the top or the compression in the bottom flange, at whatever spot it may be taken. It is only necessary to reverse the bent lever and to assume  $f$  in the top instead of the bottom flange to prove this.

The value of  $S$  in the formula  $S = \frac{W \times l}{d}$  can be ascertained graphically as in Fig. 16. Assuming  $pq$  as the depth ( $d$ ), and  $qr$  as the

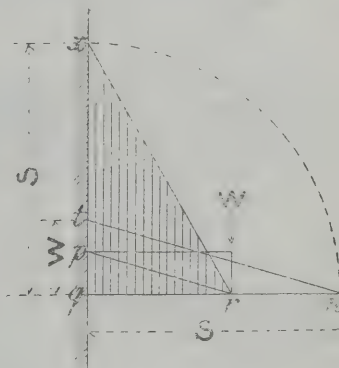


Fig. 16.

length ( $l$ ) of the cantilever, set up  $tq$  equal to  $W$ , according to a scale of weights as previously explained. Join  $pr$ , and from  $t$  draw  $tu$  parallel to  $pr$ , meeting  $qr$  produced in  $u$ ; then  $qu$  is equal to  $S$ , for  $pqr$  and  $tqu$  being similar triangles, therefore—

$$qu : qr :: tq : pq,$$

or, multiplying the extremes and means inversely and equating—

$$qu \times pq = tq \times qr,$$

that is—

$$qu = \frac{tq \times qr}{pq} = \frac{W \times l}{d}$$

which proves that  $qu = S$  to the same scale of weights to which  $tq = W$ .

By placing the compasses at  $q$ , and describing

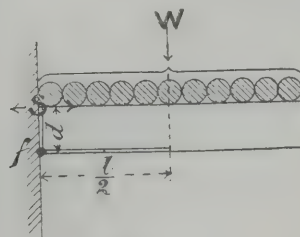


Fig. 17.

a quadrant with radius  $qu$ ,  $qx$  is made equal to  $S$ . Join  $xr$ , and then ordinates drawn from

\* All rights reserved.



the bottom flange to the line  $xr$  will denote the strains in the flanges at any points to the same scale as that to which  $tq$  represents  $W$ .

When a cantilever is subject to a distributed load, such load may be assumed to act at its centre of gravity (see Fig. 17). The bending moment is then but  $W \times \frac{l}{2}$ , the bent lever being as shown in Fig. 17, and the equation of equilibrium obtained by taking moments round the fulcrum  $f$  becomes—

$$S \times d = W \times \frac{l}{2}$$

$$\text{or } S = \frac{Wl}{2d}$$

If the strain be wanted at any intermediate spot, it can be ascertained as shown in Fig. 18,

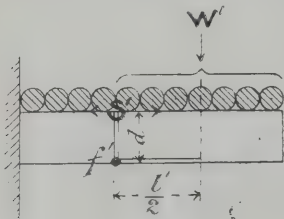


Fig. 18.

that portion of the load only being considered which rests between the spot at which it is required to determine the strain and the end of the cantilever. The equation of moments would then be—

$$S' \times d = W' \times \frac{l}{2}$$

or

$$S' = \frac{W'l}{2d}$$

In this case, as in that of an end load, there is found to be no strain at the end of the cantilever,  $W$  and  $l$  having both diminished to nil, while the greatest value of  $S$  is obtained at the support where both  $W$  and  $l$  are greatest; but

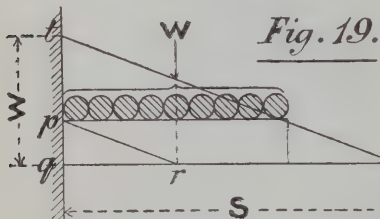


Fig. 19.

the intermediate variations are as the square of the distance from the extremity of the cantilever, instead of being uniformly as the distance.

The value of  $S$  in the formula  $S = \frac{Wl}{2d}$  can be ascertained graphically, as shown in Fig. 19, in which the same letters have been adopted as

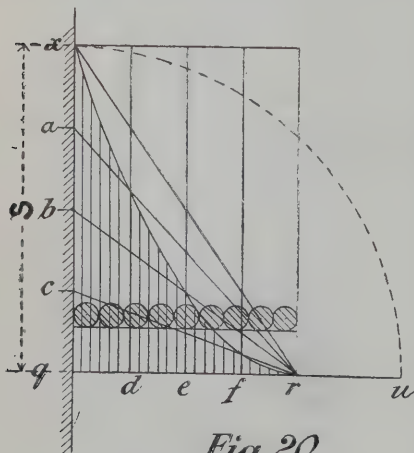


Fig. 20.

in the similar Fig. 16,  $r$  now being placed under the centre of gravity of the total distributed

load  $W$ . The same reasoning being followed as that used with Fig. 16, it is seen that in the similar triangles  $pqr$ ,  $tqr$ .

$$qu : qr :: tq : pq$$

or

$$qu \times pq = tq \times qr$$

$$\text{therefore } qu = \frac{tq \times qr}{pq} = \frac{W \times \frac{l}{2}}{d} = \frac{Wl}{2d}$$

and, therefore,

$$qu = S.$$

To determine the strains at intermediate points, set up  $q$  equal to  $qu$  (or  $S$ ), as shown in Fig. 20. Between  $x$  and  $r$  set up a semi-parabola, having its apex at  $r$ . This may be accomplished by dividing  $xq$  into any number of equal parts, as at  $a$ ,  $b$ , and  $c$ , and  $qr$  into the same number of parts as at  $d$ ,  $e$ , and  $f$ . Join  $a$ ,  $b$ , and  $c$  to  $r$ , and through  $d$ ,  $e$ , and  $f$  erect vertical lines. Join  $x$  to  $r$  by a line passing through the points of intersection, thus tracing the outline of a semi-parabola. Ordinates drawn to this from the bottom flange will give the strains at all intermediate points to the original scale of weights.

[Some correspondents have taken exception to the theory advanced in the chapter upon shears with respect to the shearing stresses in the centre of a beam when loaded at more than one point. It is, however, correct, for the whole of the first load which is met by one of the reactions cannot possibly go to diminish the effect of the reaction; but only that portion of it to which some of the reaction is due. The same thing occurs on the other side, and the remainder, being similar forces in parallel directions, have to be added together to denote the shear in the beam between the loads. Fortunately the matter is in practice one of small importance, as there is always a great excess of metal in the webs of flanged structures over that which is necessary to resist the shear, even if it were true (which it is not), that the webs alone offered any resistance to the shearing stress.]

(To be continued.)

#### GOVERNMENT BUILDING CONTRACTS.

THE reply of the First Commissioner of Works (Mr. Plunket) to representations made to him by a deputation on behalf of the various branches of the London building trades has just been published.

The deputation suggested that in all future contracts entered into by the Commissioners of Works Department a clause should be inserted providing—(1) That all labour employed by the contractors should be of the best quality; (2) that workmen should be paid at the standard rates of wages; (3) that the working hours should be in accordance with the rules and customs of the London building trade; (4) that no overtime should be permitted; (5) that no portion of the work should be sub-let. The First Commissioner replies that the form of contract at present in use covers the first and last suggestions. As regards overtime, he says "there is a standing order that overtime is only to be resorted to in cases of urgent necessity." "There remains," continues Mr. Plunket's secretary, "the second suggestion that workmen should be paid at the standard rate of wage, a point which is not touched either by the form of contract or by the practice of this department. The question presents great and obvious difficulties, and the First Commissioner, after giving it his most careful consideration, regrets that he is unable to see any method of procedure which the Board could properly adopt for the purpose of promoting the object which the United Trades Committee have in view. It is of the essence of the system of contract that a contractor should be free to use his own discretion in regard to the means to be employed for executing his contract, and the Commissioner is not prepared to introduce so serious an infringement of the principle of contract as would be involved in an attempt to dictate to a contractor the terms on which he should engage the labour he employs. It is the duty of this department, as guardian of the public interest entrusted to its care, to see that a contractor executes properly and in accordance with the specification the work stipulated for in his agreement. But the duty of this department ends there, and the First Commissioner does not think he would be justified in allowing the responsibility of the Board to be extended into a region with which they have no direct concern, and in which it would be difficult for them to exercise an effective control. The First Commissioner cannot, therefore, undertake to modify the practice of the department in this respect in the contracts into which it may enter in future."

The United Trades Committee consider this reply unsatisfactory, and the secretary, Mr. George Dew, asserts that one Government contractor pays from 1½d. to 2½d. below the standard rates paid by London builders.

#### ARCHITECTS' JOINERY.

WE have often hinted how desirable a handy book of architectural joinery would be to those who require suitable designs. Mr. F. A. Fawkes published some time since a work on "Architects' Doors, and their Ornament," which included several useful types of doors; he has now brought out some details of mouldings, architraves, doors, windows, and chimney-pieces designed and manufactured by him. These details are intended to assist architects in selecting such work. Amongst the plates given are details for architrave mouldings, door-panel mouldings, dado and picture rails, enriched door mouldings, cornices, and skirtings. These are shown by photographic illustrations, half-full size, from the real examples, mitred, representing the effect of the mouldings under light and shade, by which anyone can obtain a very good idea of the executed designs. The mouldings exhibit a superior finish and sharpness; the enrichments are made from a specially-prepared composition, tough, and not liable to crack or crumble like plaster. The enriched mouldings, architraves, cornices, and dado rails comprise a variety of architectural ornament suitable for Renaissance and Classical design, the prices of which executed in red deal, pitch-pine, and yellow pine are given. The architrave mouldings are cut to proper lengths for doors up to 7ft. by 3ft. in sets of jambs and head. Thus, shouldered architraves can be had in red deal as low as 11s. per set. The interior doors show various arrangements of panels; the ornamental and exterior doors include glazed panels in various Queen Anne and Renaissance styles. Dado panelling, overdoors, friezes, mantels and overmantels, and combinations of these details appear, so that the architect can select his own details for doorways and other joiners' works. By this mode of selecting details, anything like stereotyped patterns may be avoided, and a superior class of workmanship may be secured at reasonable price. Mr. Fawkes's book of designs is published by Mr. B. T. Batsford, of High Holborn, and its price is 2s. 6d. Architects and builders will find it a useful work in the office.

MESSRS. MCGAW AND CO'S, NEW MOULDING MILLS, YORK ROAD, LAMBETH.

THE accompanying illustration represents the new premises now completed for Messrs McGaw and Co., and which replace probably the oldest buildings of their kind—viz., moulding mills—in the metropolis. These works have been carried out on an extended scale, and reflect credit upon the owners for their enterprise and artistic spirit. The design is of a Renaissance character, and consists of three unusually lofty stories, averaging 16ft. to 18ft. each in height; with a roomy basement, and with a total frontage of about 82ft.

The materials generally are Sittingbourne stocks, faced with red Farnhams and the Farnley Iron Company's buff glazed bricks, of good quality, with Portland stone dressings.

The inscription band to the front elevation forms a bold and pleasing feature, and is executed in a very creditable manner by the Burmantofts Company in their coloured glazed faience.

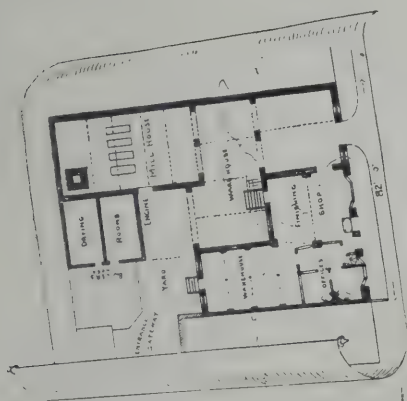
The entrance doors are of Spanish mahogany, and the office fittings in pitch pine.

The basements are lighted with Messrs. Hayward Bros. and Eckstein's well-known prismatic pavement lights. Messrs. Measures Bros. and Co. supplied the girders.

Mr. Robert P. Whellock, A.R.I.B.A., of 45, Finsbury-pavement, is the architect, and Mr. James Holloway, of Lavender Hill, Wandsworth, was the contractor.

A new hall and schools are about to be built in White Ladies-road, Bristol, in connection with Redland Park Church. Mr. H. Overton Wills, of London, is the architect.





Robert Whillock Architect  
45 Finsbury Pavement  
LONDON E.C.

MESSRS. MCGAW AND CO'S NEW MOULDING MILLS, YORK ROAD, LAMBETH.



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## ILLUSTRATIONS.

ARCHITECTURAL ASSOCIATION SKETCHES.—YORKSHIRE  
PENNY BANK, HALIFAX.—N.E. VIEW OF WONHAM,  
N. DEVON.—ST. BENET'S CHURCH, MONKWEARMOUTH.  
—NEW MOULDING WORKS, YORK-ROAD, LAMBETH.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## YORKSHIRE PENNY BANK, HALIFAX.

MESSRS. PERKINS AND BULMER are the architects of this building. We have no further particulars to hand.

## WONHAM, NORTH DEVON.

THIS house is now undergoing considerable enlargement by the addition of a fine dining-room at one end and a drawing-room at the other, and of an upper floor and principal staircase, from the designs of Mr. Brightwen Binyon, F.S.A., of Ipswich. The illustration we publish shows the entrance court, which is to the north; the main façade of the house is to the south, and commands a lovely view of the Valley of the Exe, which runs for about two miles through the estate. The erection of the tower and billiard-room, shown on the left hand of the illustration, have for the present been deferred. The contractors are Messrs. George Grimwood and Sons, of Sudbury, and the carving is by Mr. Sidney W. Elmes, of Chelsea.

## ST. BENET'S CHURCH, MONKWEARMOUTH.

THE foundation stone of this church was laid by the Bishop of Hexham and Newcastle, the Right Rev. Dr. Wilkinson, on the 28th ult. It is being erected by the Rev. Jules Du Flöer, to provide accommodation for the Catholics of Monkwearmouth, who have hitherto been obliged to utilise his extensive schools for Divine worship. The design is by Messrs. Dunn, Hanson, and Dunn, of Newcastle-on-Tyne, and is an inexpensive one, constructed of brickwork, with local stone dressings for the exterior. "Farleigh Down" stone is used in the interior. The interior effect will be one of great space, owing to the treatment of the main arcade, which rises to the wall plate, 30ft. high. The aisles have flat roofs in order to provide space for large windows, which amply light the building. In addition, there are large east and west windows. The internal dimensions are as follows:—Nave, 83ft. by 26ft.; aisles, 82ft. by 13ft. 6in.; chancel, 23ft. by 23ft.; and two side chapels 19ft. by 14ft. each. Sacristies are being built between the church and the presbytery, which was erected some years ago. The main roof is 50ft. to the ridge, and is panelled inside 40ft. above the floor level. The walls are now about 20ft. above the ground. Mr. Thomas Lumsden, of Jarrow-on-Tyne, is the contractor.

The foundation stone of a new tower now being added to St. Barnabus Church, Bradwell, Derbyshire, was laid on the 4th inst. The tower is being built of Hazlebadge limestone, with dressings of gritstone from Egan Moor, and will contain a clock with Cambridge chimes, supplied by Messrs. John Smith and Son, of Derby. Messrs. Naylor and Tait, of Derby, are the architects, and Mr. Alfred Hill, of Tideswell, is the contractor.

## ARCHITECTURAL ASSOCIATION EXCURSION, 1888.—No. II.

(WITH PHOTOGRAPHIC ILLUSTRATIONS.)

LEAVING Matlock Bath by an early train for Derby, the excursionists commenced the week's proceedings by visiting Longford Church (St. Chad), which scarcely warranted the long drive necessary to reach it. The chief point of interest in the building is the series of recumbent figures in alabaster and stone, commencing with the effigy of John de Cressey, the first rector of the parish. The others include monuments of Wm. de Salford, 1336, John de Longford, 1393, the Radcliffe's, &c. There are no other features in the church worthy of special remark. It was restored in 1843, by Stevens, of Derby. Marston Montgomery, some few miles further west, has a church (St. Giles), of some quaintness, although it seems to have been almost entirely rebuilt, and what is more important still, it is well kept and arranged, being also apparently well served. The modern wooden bell-turret over the western wall harmonises with the building as it stands on the brow overlooking the few houses which constitute the hamlet. The chancel-arch is said to be of Saxon date. We are unaware who is responsible for the work of reconstruction done here. The place was visited in passing to see the stained windows, which are of interest as specimens of Morris's glass, from the designs of Dante Gabriel Rossetti. Their effect is good and the colours harmonious, with excellent figure-drawing, as might be expected, and the glass looks as if it belonged to the church, and in no way asserts itself. No better praise could be awarded than this. At the foot of the village street is an old timber-built house, having a grand chimney built in stone and capped with brick; but not worth going out of the way to see. Somershall Herbert, two miles north of Lord Waterpark's 18th-century mansion at Dovebridge, belongs to the Fitzherbert family, thus obtaining an interest historically eventful, and the manor house is an uncommonly good specimen of half-timber construction, though neither large in size nor important in style. The "Queen Anne" alterations at the back part did much to spoil the building; but in front there is a great variety of treatment in the use of the oak timbering, which is solid, with plaster fillings or panels in simple patterns of clever design. Inside the house the good taste of the present occupier is everywhere evident, and the furnishing of the rooms is in good keeping with the place. The oak staircase, of 17th-century date, is a very pretty one, having some well-turned balusters of admirable shape. The weather during this part of the day was most unfortunate, so that no sketches of the house were possible; but it ought to be illustrated, and would make a good picture. Sudbury, the next place seen, is a mansion of considerable importance, the Derbyshire seat of Lord Vernon, who received the excursionists and took them over his house, which stands in a beautiful park of six hundred acres, close to the parish church and fronting the high road to Derby. The building is a complete example of Late English Renaissance of seventeenth century date. The lower part seems earlier than the walls above the main cornice where the angle quoins are rusticated; but although all the façades harmonise and are complete, we fancy the buildings are later than is generally supposed. Mary, widow of John Vernon, commenced the structure in 1622. Some ten years ago the late George Devey, the well-known architect, re-roofed the mansion and added the dormers and balustrade over the main cornice. The pediments have spandrels filled with carved stonework, backed by red brick, which gives them colour and interest, the scale of the carvings being massive and large. The fenestration of the façades bears but little reference to the floors inside, and thus the windows are partly shams, a not uncommon expedient in Old English domestic work of Later type. Inside the house there are some fine apartments, specially the long gallery overlooking the lake, and containing portraits of Lords Cromwell and Stafford and Sir John Vernon, three favourites of Charles I. There is likewise an extensive collection of books. The ceilings are elaborate specimens of plaster work, and the staircase is a florid example of the style. Some carvings

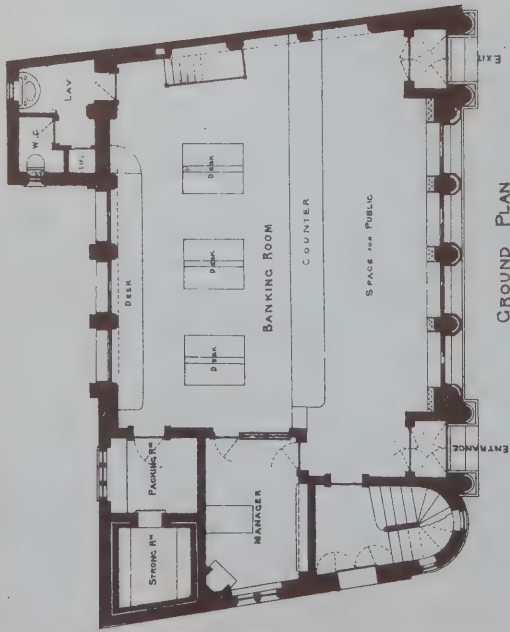
by Grinling Gibbons are shown as undoubted instances of his manipulative skill, and the family portraits by Reynolds and other masters are of great interest. The details of the exterior of the house seem ill-proportioned, but the general effect is deserving of note. Sudbury Church is full of monuments to the Vernons, commencing with that of John Vernon in 1600. Mr. Devey restored the nave, and added an organ gallery out of the north aisle very prettily. He removed the galleries round the church and re-seated it. The chancel, which is disfigured by a hideous east window of German pattern, given by the Queen in 1850, has been renovated by Messrs. Bodley and Garner, who added the stalls and reredos. The Montgomery tombs are early examples. At Hilton, still driving to Derby, a wayside timber-built house, erected by the Wakelyn family, is to be seen, and so the party, pushing on to meet the Liverpool express, passed through Etwall, where a halt was made. Here the church (St. Helen) is worth seeing, but restoration has ruined it. The founder of Etwall Hospital and Repton School, Sir John de Porte, has a mural brass in the sanctuary dated 1557, to himself and two wives. Another to Henry and Elizabeth Porte, 1512, with some other Porte monuments, constitute the chief objects of interest in the church. It has a square tower, and is picturesque enough, and so are the red brick and stone-built almshouses hard by the churchyard; indeed, the group furnishes a good specimen of Old English work erected towards the end of the 17th century, and forms three sides of a court constituting seventeen houses. In the centre is an elaborate ornamented gable and archway, with heraldic shields bearing the arms of the three trustees appointed under Charter of James I. Etwall Hall, the ancient seat of the Portes, now belongs to the Cotton family, and although built in Elizabeth's time has been so often altered as not to retain much of interest. The gardens and cut-terrace hedges are to be noted, however, as exceptionally fine gardening.

Tuesday's programme commenced by a visit to South Wingfield Manor, which we illustrated with descriptions last week, and so need here only refer our readers to page 167 for particulars, as the President, Mr. H. D. Appleton, took occasion to do when the party assembled within the confines of the old mansion. A long hour's drive brought the excursionists to Hardwick Hall, of which we print a view taken by Messrs. Bedford Lemere and Co., whose skill as architectural photographers is well known. In the BUILDING NEWS for January 6 last we also gave four charming interiors from the camera of Mr. Richard Keene, accompanied by an historical account of this complete and interesting mansion, the Marquis of Hartington's Derbyshire home, described by Lord Byron as "a most beautiful and venerable object of curiosity," and whatever may be said of its architecture, no doubt he was right. Along the balustrade of the towers, of which there are six, and in the parterre of the gardens, appear the builder's initials "E. S.," Elizabeth Shrewsbury, more familiarly known as "Bess of Hardwick," who was born in the old Hall, now a roofless, moss-grown, shattered building, situated a little to the S.W. of the greater mansion. The hall is full of good old furniture, both Tudor and Jacobean; rich tapestries, illustrative of the story of Esther and Ahasuerus; St. Paul's life, and a vivid rendering of the dangers encountered by Ulysses, the restless hero of Homer's "Odyssey." The house was built between 1580 and 1597, probably from the designs of the Smithsons. Its chief features are the chapel, with old ecclesiastical needlework and painted tapestries, the dining-room, drawing-room, staircases, state-room, library, "Mary Queen of Scots' room," picture galleries, and presence chamber. Henry Shaw, in his "Elizabethan Mansions," gives some finely drawn views, with elevations and plans, of the house; and Nash, in "The Baronial Halls of England," has some admirable drawings of the place, which stands in a grand park of 600 acres on a hill. The general effect of the building is unquestionably imposing, but the architectural detail is crude, and wanting in refinement, like much of the work which Huntingdon Smithson executed at Bolsover Castle. Walpole admires its extent and vastness, and we can do no more. Nevertheless, it is a treasure-house









GROUND PLAN



FIRST FLOOR PLAN





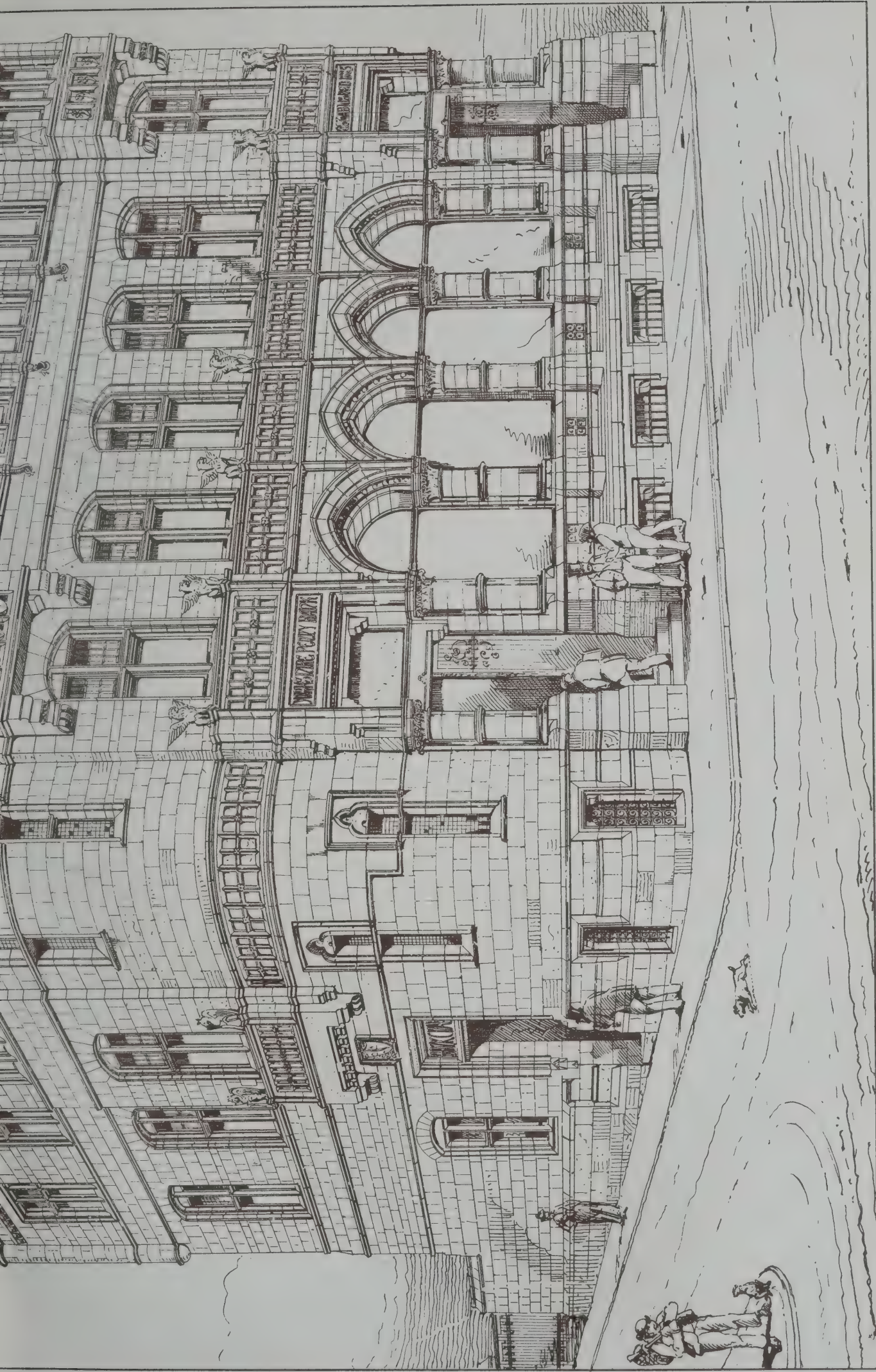


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

YORKSHIRE · PENNY · BANK · HALIFAX · MESSRS PERKINS & BULMER · ARCHTS













N.E. view of WONHAM  
NORTH DEVON  
The residence of J. R. Holland Esq  
*Brightwen Binyon F.S.A.  
Architect.*







THE BUILDING DEWS, AUG. 17. 1888.

WOLLATON HOUSE









THE BUILDING DEWS, AUG. 17. 1888.







"Photo-Tint," by James Akerman, 3, Queen Square London, W.C.

VIEWS OF HADDON HALL, PHOTOGRAPHED BY F. FRITH & CO.

THE BALL ROOM.









"Photo-Tint" by James Akerman, 6 Queen Square, London W.C.









Saint Benet's Church. Monkwearmouth. Co. Durham.

DUNN HANSON & DUNN.  
Architects 1888.







of magnificent tapestries which for colour are perfectly wonderful; and grand as the pictures in the long gallery are, it is a pity that the tapestry seen *in situ* should be covered almost entirely all over. The old hall was built about 1520, and in some of its detail almost exactly corresponds with the existing hall, as, for instance, in the remains of ornamented plaster-work on the walls. Journeying still northwards, some six miles to the east of Chesterfield's crooked steeple, the party went over the hills by Calow and Duckmanton to reach the disappointing and grey fortress of Bolsover, towering over the quaintest of villages, and the dark verdant slopes of woodland mapped out by shadowed country lanes. The Maypole hard by was the familiar hostelry where Barnaby Rudge and his magpie found rough hospitality. Bolsover's history is fraught with many a record of battle, and back in the times of the Britons was a strongly fortified place no doubt, with earthworks left by the Danes and ancient defences erected by the Romans. There exists no trace now of the Norman fortress built by the Peverils, and about which entries remain dated 1172 and 1216, when, we read, the castle was strengthened. During the reign of Henry III. Bolsover had a tumultuous career, and when Sir Charles Cavendish, younger son of "Bess of Hardwick," bought the manor of Gilbert Talbot, Earl of Shrewsbury in 1613, the buildings were in ruins. "The new house at Bolsover" was his work partly; but his son, the Marquis of Newcastle, finished it, Huntingdon Smithson, who lies in the neighbouring church, being his architect. Here Charles I. and his queen, Henrietta Maria, were magnificently entertained on three occasions with lavish prodigality at a cost of £14,000, "Love's Welcome," by Ben Jonson, was specially written for one of these occasions, and the masque was performed on the terrace. In 1633 Bolsover Hall was wainscoted and filled with works of art and beautiful tapestry, but this is now gone. During the Commonwealth the grand range of buildings in which Charles had been made welcome with brilliant pageants were ruined to a mere skeleton, but the Duke of Newcastle, after the Restoration, partly repaired them. About 150 years ago this part of the castle was allowed to go to decay, and the valuable pictures and furniture removed to Welbeck. The Riding House was fairly capacious, and is now little better than a shell, but it has a good roof and handsome stone dormers. The dining-room was 78ft. by 33ft., the drawing-room 39ft. by 33ft., and the picture-gallery 220ft. by 28ft., or 54ft. longer than the gallery at Hardwick, and 11ft. longer than the ball-room at Haddon. The building which now constitutes the residence at Bolsover is the Elizabethan reproduction of the Norman keep, erected with the materials of the ancient tower, and the principal rooms are curious apartments, with central pillars and beautiful groined ceilings in two or three of the rooms; they contain some singular examples of woodwork made up from various sources. A library and museum till lately occupied the largest of the rooms, which measures 40ft. long, and is known as the "star chamber" because it has a stellated ceiling in fearful blue. The Etruscan and Grecian curiosities once here are now gone, and the castle is empty and spoiled of its hangings and Stuart relics. The line of old fortifications may be easily traced to the verge of the precipice upon which the castle stands. The following curious old MS. rhyme quaintly compares the relative characteristics of Bolsover with neighbouring houses:—

"Hardwicke for hugeness, Worsop for height,  
Welbeck for use, and Bolser for sight;  
Worsop for walks, Hardwicke for lall,  
Welbeck for brewhouse, Bolser for all."

Mr. J. A. Gotch described Bolsover Castle on the present occasion. It is, however, by no means picturesque, and, beyond the marble chimney-piece in the keep or tower building and the groining, there is not really much of interest to the architect, in spite of all that has been said. No doubt the fireplaces are, in a way, unique, but they are faulty in detail and proportion, save, perhaps, that in the groined hall and small room in the outbuildings. The mural paintings are exceedingly poor. As for the wanton Duke of Newcastle's palace, its ruinably reflects the history of his doings and his time. We shall give two illustrations of

the Elizabethan Castle next week. With a hasty visit to Chesterfield, where the twisted spire\* was seen, the day's proceedings terminated, and the travellers returned by train to Matlock.

Accompanying our plates to-day the following notes respecting Haddon Hall, visited on Thursday, may be of interest.

Haddon's history, unlike that of many another feudal mansion, has from the days of its earliest lords been associated with hospitality and the gentler arts of peace, neither sullied by acts of oppression nor marked by feuds or wars. Its grey stone turreted walls, ivy-clad and nestling among the trees, speak at once of home, and rich with picturesque beauties, architectural grandeur, and the delightful charm coming of tradition and romance, the old hall cannot fail to attract the artist and the antiquary. Its builders may have been men of rough manners and sparse culture; but under a crude exterior generous hearts at all times have been known to beat, and the owners of Haddon were frequently men whose characters proved this rule. Its earliest records reach back to the days when Haddon was a berewite of Bakewell, and Henry de Ferrars, the first known lord, held the place by a grant of the Conqueror (1086), which included no less than 114 manors in Derbyshire alone. He claimed one carucate (8½ acres), but subsequently, in a greatly extended holding, Haddon belonged by tenure of knight's service to William Avenell, who gave part of his land to Roche Abbey, and thus propitiated the monks there, and obtained their prayers. His pretty daughter, Avica, married Richard de Vernon, who, in consequence, became possessor of Haddon Hall; and his family held the property for three centuries, until it passed to the family of Manners. Nearly everybody knows the story of the romantic marriage, in consequence of which this transfer came about. The secret attachment of beautiful Dorothy Vernon to John Manners, with whom she stole away from the Hall at night, when the lovers met on the terrace during the progress of the festivities and ball given in honour of her sister's wedding, is well described in verse:

"It is night with never a star,  
And the hall with revelry throbs and gleams;  
There grates a hinge—a door is ajar—  
And a shaft of light in the darkness streams.

"A pale sweet face, a glimmering gem,  
And then two figures steal into light;  
A flash, and darkness has swallowed them,  
So sudden is Dorothy Vernon's flight."

Then came the wild-ride scamper across the country to the altar where the sacred bond was tied. On the death of Dorothy's father, Sir George Vernon, about 1570, she inherited the property, and so her husband, Sir John Manners, became the owner, and through the Manners family it now belongs to the Duke of Rutland. Dorothy's door still remains as she unbarred it, and the steps outside the threshold which she crossed to join her lover are the same as on the night of her flight from home, only that time has given the place a softened beauty, and the poetry of the incident enhanced its interest. Sir George Vernon was known as the "King of the Peak," and many a charming story is told of his despotic liberality. He succeeded to the estates in 1515, and during his reign the Hall was filled with an almost perpetual odour of feasting, for he was neither niggardly in his banquets nor turned the hungry away. The plan of the buildings at Haddon, roughly speaking, is a parallelogram, divided into two courts, like South Wingfield Manor, by the hall and kitchen range. The average length is 250ft. by 150ft. wide. We gave a complete set of measured drawings of the hall,† with plans, sections, and elevations, in the BUILDING NEWS for Feb. 11th and 18th, and March 11th, 1887, from the R.I.B.A. Silver Medal drawings, by Mr. Frank Bellis. These plates are now out of print; but we understand that Mr. John Douglas, of Chester, is about to publish a monograph of Haddon Hall, comprising these same drawings and a series of

\* Measured drawings of this spire were printed in the BUILDING NEWS, Sept. 3, 1888.

† Other illustrations of Haddon Hall, including measured details of the woodwork in the chapel, have appeared in the BUILDING NEWS for April 2 and 16, 1875; April 2, 1878; July 6 and Oct. 5, 1883; and July 11, 1881. Some of these are by W. H. Lethaby. In the A.A. Sketch-book New Series, sketches are given of Haddon Hall in Vol. I. (1881) and Vols. III., IV., and V.

photographs, specially taken by Mr. Bedford Lemere for the work. To-day we print two detailed views, showing the interior of the ball-room or long gallery, and the drawing-room. These beautiful photographs are by Messrs. Frith and Co., of Reigate, and they were shown at the recent exhibition of photographs held in the Crystal Palace. The same firm have other fine views of Haddon Hall, and that of Dorothy Vernon's door is one of the most exquisitely-managed prints that we remember to have seen. The double-page geometrical drawing also given herewith represents the rich woodwork, panelling, and doorway on the north side of the ball-room set out in detail. The original of this plate was exhibited at the Carpenters' Hall, by Mr. Andrew Erskine, of Manchester, in the Exhibition of Joinery lately held there. To recount a description of Haddon Hall here would take more space than we have room for; but we may briefly return to the subject next week, when other illustrations of the place will appear in our pages, with concluding notes on the excursion.

#### COMPETITIONS.

NEW YORK.—The competition for the municipal buildings to be erected in the Central Park, New York, has been decided by the award of the third prize, of three thousand dollars, to Mr. B. N. Crawford, of Brooklyn, the fourth prize, of two thousand dollars, to Mr. Appleton P. Clark, of Washington, D. C., and the fifth prize, of one thousand dollars, to Mr. Joseph H. Stark, of New York. Besides these, a special prize of one thousand dollars was given to Messrs. Weston and Tuckerman, of New York, and another of two thousand dollars to Mr. Charles B. Atwood, of New York, whose design had been placed first by the judges, but was technically ruled out for failure to comply with all the requirements. Mr. Atwood will probably be further engaged so as to adapt it to a smaller building, possibly on another site.

#### SCHOOLS OF ART.

CRYSTAL PALACE.—The award of scholarships in connection with the Crystal Palace Company's School of Art, Science, and Literature (Ladies) was completed on Saturday. The Scholarship in Art was adjudged to Miss Berta Ohlenschlager, of Sydenham; the medal for painting in water-colours to Miss Kate Bennett, of Forest-hill. The judges were Mr. J. B. Burgess, A.R.A., Mr. C. B. Birch, A.R.A., and Mr. R. Beavis, R.W.S. Certificates were also awarded to students for painting in oils, drawing from the antique, and drawing from the life.

#### CHIPS.

The trustees of the British Museum have decided that the recension of the "Book of the Dead" now in the museum, and known as the "Ani" papyrus, shall be produced in facsimile, with the illustrations in the colours of the original, and the work is now being executed by Mr. Griggs. This hieroglyphic papyrus was written for a Royal scribe, Ani, about the commencement of the 19th dynasty—circa 1400 years B.C. It is complete, the first and last vignettes being intact. The papyrus contains a chapter of the "Book of the Dead," the 175th, not found in a perfect state elsewhere.

It is reported from Darlington that a warrant has been issued for the apprehension of Thomas Toward, builder, brickmaker, and contractor, Shildon, who is accused of obtaining money advances to the extent of about £15,000 by means of forged deeds. Toward disappeared about three weeks ago, and has not since been heard of.

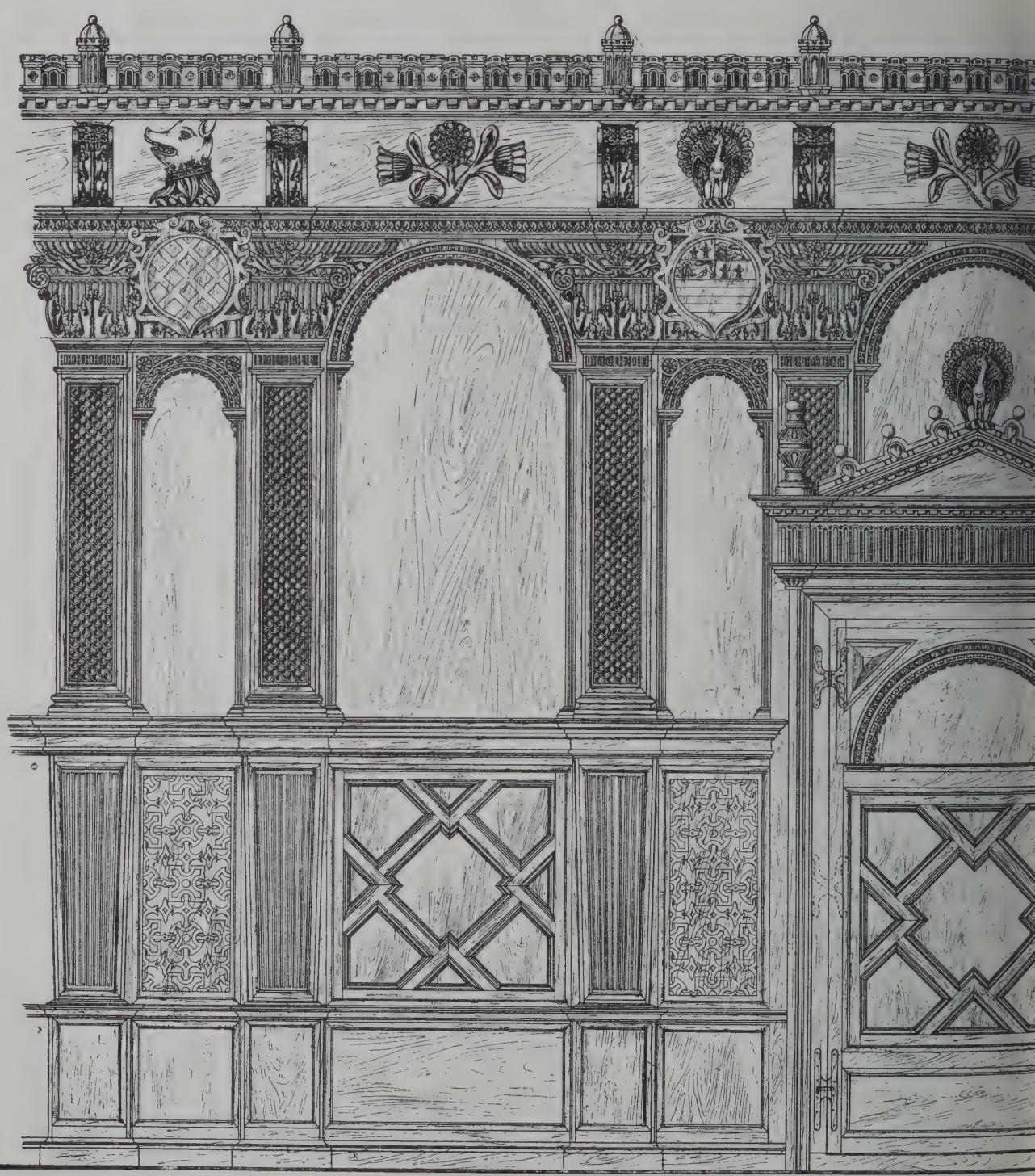
Great efforts are being made to complete the new Roman Catholic Cathedral in Pekin, which takes the place of the Pei-Tang Cathedral restored to the Emperor of China, by December 8. The architect and builder is Abbé Favier, who has collected great stores of bricks, stone, and timber, and 600 workmen are now employed daily on it.

The School Board for Kinghorn adopted on Monday plans by Mr. John Murray, of Kirkcaldy, for a new infants' school. Accommodation will be provided for 250 children at an estimated cost of £1,100, or £4 8s. per head.

The Great Eastern Railway Company's new line from Shenfield to Southend-on-Sea has just been completed, and was inspected by the directors last week. Messrs. Holmes, King, and Co. have been the contractors.



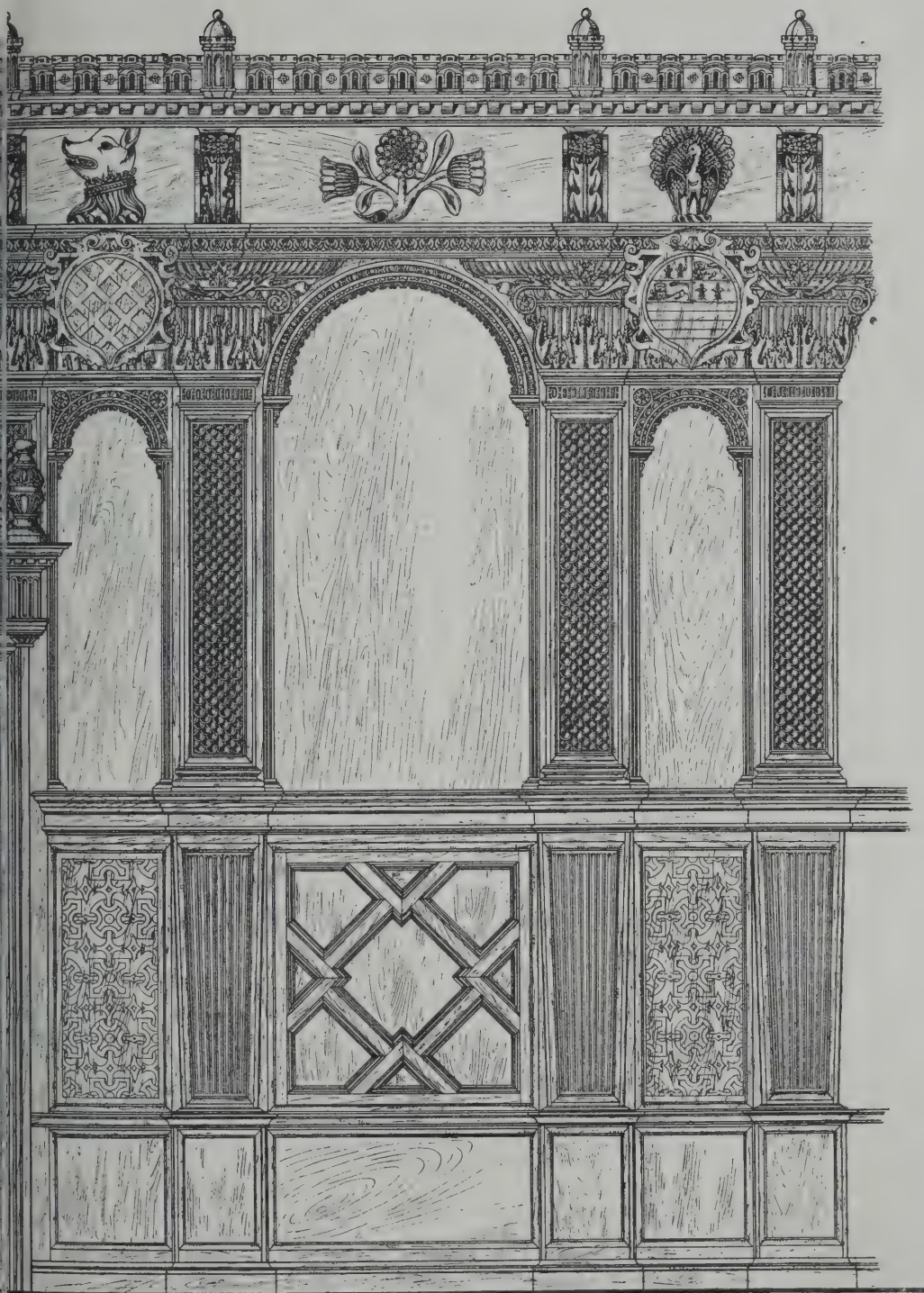
— Haddon Hall, — Derbysshire, —  
— The Ball Room, —



Spec.

— Detail showing Doorway &c —  
SCALE OF 1" = 4'  
DRAWN BY ANDREW





h Side. —

— Section. —

6 7 FEET



## WAYSIDE NOTES.

THE Temple of the Sun whose cornices of burnished gold once shone forth in dazzling brilliancy from a towering mountain city of Peru, and whose golden image of the source of light, affixed to its western wall, caught the early morning rays that streamed through the great eastern portal, and reflected them on to the polished surfaces of innumerable plates, mirrors, and bands of gold, till the light of a thousand suns seemed to pervade the vast interior, is an edifice of antiquity that is exceptionally fascinating to the imagination, and one which impresses us more than anything else with the magnificence of the grand old Inca race. Little should we dream, when pondering over the past glories of this "Place of Light," as its builders called it, that its hallowed site would ever be in danger of being disturbed by the operations of a treasure-seeking Limited Liability Company. Yet it appears more than probable that, although the avowed object of the recently-formed *Compania Anonima Exploradora de las Hucasdel Inca*, on which there was an interesting article in the *Standard* of the 14th, is only to ransack ancient Peruvian burial-grounds, the directors, having once got in the thin end of the wedge, will turn their energies in the direction of Incarial ruins; and of these the Temple of the Sun assuredly presents the most tempting field, as we know that this building was second to none in point of richness in golden ornaments, what with cornices, friezes, bands, statues, and other enrichments. And, although when the murderous Spaniards appeared upon the scene, they ran off with all the gold that they could lay their hands upon, including the magnificent image of the sun, we may reasonably conclude that, in a treasure-burying age, much of the golden ornamentation would have been secreted in or near the site of the temple itself.

The objection to the ravages of the *Compania Anonima Exploradora, &c.*, is one of sentiment merely. In the "rampage" for treasure they may come across material beauty, and we ought to be rather glad to hear that fresh discoveries have been made through their explorations, if these discoveries throw any light on the much-vexed question of Incarial and pre-Incarial architecture. There is a rich field in South America for the archaeologist. Now that the early remains of the Old World have been pretty well overhauled, and every Cook's "circular" tourist knows all about the architecture of Ancient Egypt, and the mystery of old Assyrian art has been fully unravelled, we must look to the New World for further archaeological discoveries. It has long appeared to me that the ancient architecture of America has not received the attention its intensely interesting nature would warrant, although some months back I noticed in the *American Architect* that a gentleman of our profession had discovered that the earliest monumental remains of the New Hemisphere surpassed in age, by many thousands of years, the most venerable stones in the Old World. I wonder what Mr. Fergusson would have said to this? Such conjecturing is neither of use nor interest. An actual tour of an English architect amongst Peruvian architectural remains would be intensely interesting to a large section of the public; and in these days of international travelling, and of case-hardened globe-trotters, it should not be a herculean task to penetrate to the region of the Andes. It is true one would have to be an enthusiast of enthusiasts. To me the architecture of the Incas and their predecessors seems a wonderfully fascinating subject, and in the many hundred corners of the globe where I have wished to stand must be included the shores of Lake Titicaca, where are the vast, solitary monoliths of a pre-Incarial temple, called Tia-Huanacu; the deserted city of Pachacamac, where stands a great ruined temple, once, it is said, with doors of gold inlaid with precious stones; and the city of Cuzco, where was the world-famed Temple of the Sun.

The Panama Canal, according to an American engineer who writes to the *American Engineering News*, is not progressing so satisfactorily as it might. In spite of an immense amount of costly machinery and plant, he says, the unavoidable impression gained from a few

days' survey of the work is one of non-effectiveness. The steam excavators, of which we heard so much, are, it appears, only being employed as elevators for soil previously excavated by hand labour, and this is a very wasteful manner, fully 90 per cent. of all material excavated being handled twice and three times. Most of the excavating and dumping plant is badly deteriorated, and will have to be replaced if the work continues a year longer. The formation of the locks is being put off in an undesirable manner. The writer thinks that the intention is to finish the canal first, and in order to obtain money on "call" it will be represented that the canal is completed, excepting the locks. This is not a cheerful picture; but we must make allowance for the fact that it is an American report, and the Yankees, I understand, have all along considered that the making of the Panama Canal should have been left in their hands.

The Manchester Ship Canal, on the other hand, is progressing rapidly. According to reports received on the 15th, the work is being carried on with extraordinary vigour. Vast docks are being constructed in connection with the canal. On one section of the new waterway no fewer than 1,700 men are engaged, night and day, the length of the section being little over four miles. The steam excavators here are not being employed as at Panama; but are digging out the actual channel for the canal, and disposing of the earth in prodigious quantities. Perhaps it is hardly fair to contrast the undertaking in England with that in America, as the difficulties of the latter are incomparably greater.

The Board of Works Commissioners, having taken all the evidence of material importance that is at present available, have adjourned *sine die*. At the last sitting of the Commissioners Lord Herschell made one of his pithy remarks anent the sewage question. His lordship stated that, in his experience, no two authorities agreed as to the best method of dealing with the sewage of large cities, and our own experience tends in the same direction. Sir Robert Rawlinson's views on the new works at the outfalls on the Thames, which you commented upon last week, are anything but encouraging. I should have thought that, far as the new system may be from perfection, it would have been a vast improvement upon the old plan of discharging crude sewage into the river. In this matter of purifying old Father Thames, I notice that the Conservators have just issued their annual report. It is a good report, and indicates a great improvement in the condition of the water. When Henley Regatta came along, I looked about in vain for some information as to whether the house-boat nuisance had been prevented; but, it now appears, strict measures were taken to put a stop to what was a source of considerable pollution. Indeed, the only noticeable source of contamination to the river above the intakes of the water companies is the town of Staines. Staines ought to know better, as I have before intimated; and every drinker of water drawn from the Thames below this town ought to help to put down the nuisance. The Local Government Board have just issued directions to sanitary authorities in case of epidemic diseases, and much is said of the importance of an uncontaminated water-supply; but the inhabitants of the south-western suburbs of London, many of whom drink three glasses of sewage in every hundred of pure water, may well ask to be first supplied with water from an uncontaminated source before being lectured as to how to preserve it from pollution.

Metropolitan improvements seem to be associated in the minds of members of the Board of Works with pulling down something. So long as the Board officials get through a lot of this sort of work they seem in good humour. Well we, as architects, cannot complain at this. But it is curious to note how whilst so many important works remain to be done, a member of the Board will propose, as the most urgently needed improvement, that poor old St. Mary-le-Strand should be swept away. At the last meeting of the Board Mr. George Edwards said that the Committee had proposed local improvements amounting to £451,400, and a good deal

of it could be spent on improvements much more required. For instance, said Mr. Edwards, there was an old and dilapidated church in the Strand. Why should not that be taken down, and allow the Strand to be widened up to the Law Courts? To this sort of pulling down many of us would object, although the traffic in the Strand might be benefited. It is wholly unnecessary, however, to pull down St. Mary's Church, as the extra roadway is easily obtainable by widening the north side of the Strand near this building, and sweeping away the Holywell-street block—a means of getting over the difficulty that I should have thought Mr. George Edwards had heard of long ago.

The pick and shovel are busily engaged on the vacant ground on the western façade of the Law Courts, and soon what was a howling wilderness will be a garden fair, bright with flowers and shrubs. A curious outlook is that bounded by the medley of incongruous buildings surrounding this ground. Forming a background to the stone screen at the head of a rather picturesque flight of steps is a corner of Mr. Waterhouse's red brick and terracotta building; adjoining is the smoke-begrimed mass of King's College Hospital, with a few remains of the old "rookery" that once surrounded it; and between this and the uninteresting buildings on the south-west corner are the old red brick tenements of tree-shaded squares of Clement's Inn. When we are able to stroll about the garden paths many points of sight will display new groupings not perhaps wholly devoid of beauty.

I was at Sedbergh not long since, and was struck by the great boulder recently set up in the market-place, which was excavated during the works in progress for the great storage reservoir now being formed in connection with the Middlesbrough water supply. The giant boulder bears a brass plate declaring that it was set up there in the Jubilee year of Her Majesty, who, as most people will remember, generally travels *incognito* by her title of Countess of Sedbergh. The storage reservoir I mentioned just now is an important work, and is being carried out under the direction of Mr. James Mansergh, C.E. It is lined with about 300,000ft. super. of Claridge's Asphalte by Claridge's Patent Asphalte Company, Limited, who are generally intrusted with works of this kind where impermeability and strength are desiderata. Sedbergh and the district are worth visiting by West Yorkshire rambles. I was told there was good trout-fishing near the town, but had only time to inspect the important work referred to. GOTH.

## CHIPS.

A meeting of the parishioners of St. Michael-le-Belfrey, York, has been held to consider a report of Messrs. Demaine and Brierley, architects, of that city, with reference to the condition of the church. The report stated that a good deal of the stonework, especially the carved and moulded parts, is in a state of very rapid decay, and that the estimated cost of repairs is £1,053. The report was adopted, and a building committee appointed.

St. Andrew's Church, Stainland, about four miles from Halifax, was reopened on the 1st inst., and consecrated by the Bishop of Wakefield. Important additions and alterations have been made to the church, all that remains of the old edifice now being the tower and the north and south walls. The work has been carried out from designs by Mr. W. Swinfen Barber, and includes the removal of the old galleries, an extension eastward from the nave of 22ft. 6in., the construction of the organ-chamber and vestries, &c. The new chancel has an elliptic-formed ceiling, and is marked by four Doric columns. The cost of the entire alterations is about £3,000.

Foundation stones of a new Primitive Methodist chapel were laid at Far Cotton, Northampton, on the 2nd inst. The building will be Gothic in style, and of red bricks with stone dressings. Seats will be provided for 200 persons. Messrs. J. Ingman and Son are the architects, and Mr. J. W. Loveday, of Queen's-road, Northampton, is the contractor.

The Caledonian Hotel, at the corner of Princes and Castle-streets, Edinburgh, is about to be remodelled and enlarged from plans prepared by Mr. J. Macintyre Henry, of that city. The style adopted is a free treatment of Italian Renaissance. Four stories, with pyramidal towers at the angle of the streets and ends of the building, are to be added to the existing structure.



## THE METROPOLITAN BOARD OF WORKS INQUIRY.

THE closing session before the vacation was held by the Royal Commissioners on the Metropolitan Board of Works on Tuesday, Lord Herschell presiding.

Mr. G. B. Richardson, a member of the Board, in the minutes concerning an inquiry instituted by the Board in 1867 into the negotiations for Mr. Furness's contract for the Thames Embankment. The inquiry arose out of the examination of Mr. Furness in the Bankruptcy Court. Mr. Doulton then admitted negotiating the sureties for Mr. Furness, but denied that he had retained any of the money for his own personal benefit. The feeling of the Board was against censuring Mr. Doulton; but it was understood that if he could not get a motion from the Board which would practically have the effect of relieving him from being regarded adversely Mr. Doulton would resign. As such motion was not carried, Mr. Doulton did sign on February 18, 1868. The practice of the Board to require sureties from contractors was given up immediately after the inquiry he had referred to. Since then the Board had had 10, 12, or 15 per cent. out of the money as security that the work would be duly performed.

Mr. C. M. Roche, a former member of the Board, said the statement by Mr. Furness that he had promised to support his tender if he would enter into a contract to obtain all his granite from the Lundy Granite Company was absolutely false. Witness had not the slightest interest in that company, either by shares or anything of the kind; he had simply acted in a professional capacity. Other statements made by Mr. Furness were untrue. The best tender for the Thames Embankment contract was Mr. Ridley's, which was £495,000, Mr. Furness's being £520,000. Mr. Ridley's tender was originally selected, subject to inquiries. Witness's firm had been concerned professionally advising the gentlemen to whom the Lundy Granite Quarry belonged with reference to the formation of a company. After Mr. Ridley's contract was accepted those gentlemen sent instructions to his firm, at first to prepare a contract with Mr. Ridley to take the granite, and then to put the conditions in the shape of a letter. That letter having been sent to those gentlemen, they, and they alone, wrote Mr. Ridley upon it. Witness was introduced to Mr. Furness by Mr. Doulton. They were each other in the waiting room, which was one of the public rooms; it was not true that witness locked the door. The committee reported that the result of the inquiries regarding Mr. Ridley had not been sufficiently satisfactory to induce them to recommend the tender to finally accept his tender. Mr. Doulton had negotiated between Mr. Furness and the directors of the Granite Company, though witness was not then aware of Mr. Doulton's exact position. Witness had nothing whatever to do with either the price or the terms of the contract. His instructions were at Mr. Furness was going to enter into the same contract as Mr. Ridley; and that was all he had to do with it. When the matter came before the Board he seconded a resolution to the effect that, Mr. Ridley having agreed to deposit £20,000, his contract should remain, and voted in favour of Mr. Ridley's tender. Mr. Ridley's contract to take the granite was an absolute one; Mr. Furness's was subject to the approval of the engineer. Lord Herschell: Mr. Ridley's contract was more favourable, then, to the Lundy Granite Company than Mr. Furness's?—I should doubt very much whether it was better. Witness, continuing, said that Mr. Furness's contract was accepted. Mr. Furness did not carry out his contract with expedition, and witness had frequently to bring the matter before the Board. It appeared that by doing he had incurred Mr. Furness's enmity. Lord Herschell: Does it not strike you as being you rather in an equivocal position, in presenting a contract for Mr. Furness's signature on behalf of the Lundy Granite Company for materials for a contract which had not yet been obtained from the Board?—Witness: If I ask me now I should say "Yes," without hesitation.

Mr. Furness, recalled, said that if the Commission would read over the evidence given before the Board with reference to the Thames Embankment it would modify what had been

said by the last witness. Lord Herschell said that they would read it all.

Mr. W. R. Lawson, City editor of the *Financial News*, said he paid a visit to the Board with the view of ascertaining how the business was conducted in relation to the letting of sites. Mr. Robertson was represented in the office by a clerk, and witness asked him what the ticks meant to the sites on the plans. He said that those sites were withdrawn from sale, but he did not know why, and in Mr. Robertson's absence he had no authority to give the public information at all. Witness afterwards called upon Mr. Robertson and asked him about Shaftesbury-avenue. He said, in reply, that the tenders received and accepted were never made public in any way, and that the public had no access to them whatever, either as ratepayers or tenderers. The minutes of the Board contained very little information with regard to the letting of sites. Witness said that he had examined the accounts of the Board so far as they were published. Since 1855 the Board had, he said, levied rates to the amount of more than £15,000,000; the coal and wine duties had yielded £8,000,000; the Board had raised £37,000,000 by loans, and thus had the spending of at least £53,000,000. No detailed accounts of this expenditure had yet been published. Particulars had been promised in an abstract said to have been presented to Parliament; but this abstract had never been printed.

Mr. Arthur Gunn, chief of the Accountant's Office of the Board of Works since 1869, said that the accounts published as a Parliamentary paper by the Board were considered the best form of accounts. The public could attend the audit.

Colonel Jones, V.C., said he was a partner with Mr. Bailey Denton, and on the 4th of May he sent in a memorial to the Commission containing precise charges against the Board with reference to the London sewage. The Board had taken no complete steps to ascertain what the probable cost of the permanent recommendations made by Lord Bramwell's Royal Commission would amount to before they rushed into very high experimental costs for attempting to avoid the permanent remedy.

Lord Herschell: This question of the disposal of the sewage is a question on which there is great difference of opinion. My experience is that no two people are agreed as to what system is good and what system is bad.—Witness: I admit all that, but I maintain that the scientific Royal Commission investigated the thing fully, and their conclusions have been thwarted.

Mr. Selway gave some further information as to the way in which the Works committee dealt with compensation cases.

Sir Joseph Bazalgette was recalled, and stated that the course pursued by the Board for the disposal of the London sewage was the right one. If they had undertaken the permanent works suggested at a cost of four million sterling it would have enormously increased the rates, and there would have been a revolution in London. What the Royal Commission estimated would cost £200,000 a year the Board were now doing for £76,000 a year; and that was the result of careful experiments.

Lord Herschell said the Commission had received suggestions that the expenditure upon the parks had largely increased since they had been taken over by the Metropolitan Board. They had had an investigation made, with the result that they were satisfied that even if, upon the whole, the expenditure was larger it was only so to a trifling extent, and there was not any ground for supposing that there had been either dishonesty or maladministration in that respect.

Mr. Blashill, the superintending architect of the Board, having given evidence, Lord Herschell said: The Commission have taken all the evidence which appeared to them material which is at present available, and we propose now to adjourn *sine die*. Before adjourning, the Commissioners desire to express their obligations to all those who have assisted them in their inquiry, and especially to the solicitors to the Inquiry Committee, for the care with which they have investigated some of the many communications which the Commissioners have received. They desire also to thank the Metropolitan Board for the informa-

tion, documentary and otherwise, which has been tendered, and to say that this information has been readily supplied without delay.

The Commission then adjourned. The report will be made within a couple of months.

## BOOKS RECEIVED.

*Illustrations of Old Ipswich* (Ipswich: J. Glyde, 35, St. Matthew's-street).—Part VIII. of this work deals with the Cornhill and its associations. The Cornhill, always the centre of municipal, mercantile, and political life in the borough of Ipswich, has been completely transformed during the past century: its picturesque and distinctive features, the Shambles, and their successors, the Rotunda, the Moot Hall, and the Market Cross, have been entirely swept away, with nearly all the old buildings which formerly surrounded the open square, and within the past twenty years the erection of a new Town Hall, Post Office, and Corn Exchange, in Venetian-Gothic and Free Renaissance styles, have effected a change in the appearance of the place. The history and character of the old buildings now demolished are described with the pen of an enthusiastic and painstaking antiquarian by Mr. Glyde in the number before us, and the many associations connected with the site are so interwoven with the architectural description as to sustain the interest of readers who know little or nothing of the town under notice. Careful examination of the entries as to the Shambles in the Chamberlain's accounts reveal no particulars concerning anyone bearing the name of Cardinal Wolsey, except entries between 1585 and 1587 relating to the payment of "Mother Wolsey" (or Widow or Elizabeth Wolsey in other places) for acting as "skavenger." The part before us is illustrated by an autograph, giving a facsimile of a drawing of the Cornhill as it appeared in 1785. The square is easily recognisable to persons familiar with Ipswich; but every feature and building is altered—the picturesque 16th-century cross is replaced by a hideous cast-iron lamp column and fountain of ironfounder's stock-pattern type; for the gabled half-timber houses stretching up Tavern-street, strewn in irregular perspective, are substituted a uniform row of white brick fronts, and a widened but still narrow thoroughfare cut up by tram lines, while the pseudo-Classic tower of St. Lawrence Church, which in the illustration peers over the roofs behind the Cross, is now refaced in flint and stone flushwork in modern Perpendicular style.

## CHIPS.

Good progress is being made with the erection of the new town-hall at Dewsbury, and the town council decided last week to obtain tenders for lighting the building by electricity. Mr. Henry Holton, of that town, is the architect, Messrs. E. Chadwick and Sons are the contractors, and Mr. W. H. Williams is the clerk of works.

The tender of Messrs. Mowlem and Co. has been accepted at £28,200 for the erection of public baths and wash-houses in Buckingham Palace-road for the baths commissioners for St. George's, Hanover-square. The architect is Mr. F. J. Smith, whose designs were recently, it will be remembered, selected in competition.

Building operations have been commenced for the erection of the first portion of a church at Ribbleson, Lancs. The present section will comprise the lower part of the tower, the nave and transepts, and the chancel and chancel-aisles, the upper part of the tower and the spire being left for future operations. The architect, Mr. R. Knill Freeman, of Bolton, expects that the work will be completed soon after Christmas. The church is to be dedicated to St. Mary Magdalene, and will accommodate 200 people. The cost of the incomplete church is estimated to be £2,500.

The annual meeting of the Essex Archaeological Society was held at Chelmsford on Thursday in last week, under the presidency of Mr. G. Alan Lowndes. After the transaction of formal business, an excursion was made to the churches of Great and Little Baddow, Hatfield Peverel, Boreham, and Springfield, to Hatfield Priory, and to New Hall, now occupied as a convent.

While digging among the ruins of the ancient Greek town of Chersonese, near Sevastopol, some workmen came upon the workshop of an ancient Greek sculptor, in which was an oven for baking clay models and about 50 terracotta figures belonging to the third century B.C.



## Building Intelligence.

**AUCKLAND CASTLE.**—The chapel of St. Peter in Auckland Castle, built by Bishop Cosin in 1665 on the site and with the materials of the baronial hall, has just been restored at the cost of the present Bishop of Durham, and was reopened recently. The restorations undertaken by Dr. Lightfoot, and for which Mr. C. Hodgson Fowler, F.S.A., of Durham, was the architect, may be divided into five sections, of which the first comprises the three east windows, the second consists of a reconstruction of the reredos and sanctuary, and the windows of the north and south walls form the third. They contain historical subjects connected with the see; while the fifth section comprises a display of episcopal shields on the walls of the chapel, and figures of angels above the arcade.

**HARROGATE.**—The memorial stones of a new Wesleyan Chapel and school were laid at Starbeck, Harrogate, on Monday, August 13th. The chapel is 41ft. by 31ft., with vestibule and lobbies; the school 27ft. by 18ft. The walls are of blue flagstone, with yellow sandstone dressings, and slated roof. The chapel, with open roof, is 22ft. to the collar. There are inlet fresh-air flues in buttresses, and vitiated air extractor on roof. The accommodation is for 200 persons, and the school for 70, at a cost of £850. Mr. J. Sadler, of Starbeck, is the builder, and Mr. T. Butler Wilson, of Leeds and Harrogate, is the architect.

**PETERHEAD.**—The buildings erected on Salt-househead in connexion with the new convict prison at Peterhead, having been completed, were handed over by the contractors, Messrs. MacAndrew and Co., Aberdeen, to Her Majesty's Prison Commissioners on the 31st ult., and were occupied for the first time last week. The space inclosed by the prison walls is six acres. Provision is made for the extension of the prison until it can accommodate 300 convicts, and for the erection of another block, also to contain 300 convicts. The prison is four stories in height, 156ft. 10in. long by 40ft. wide. A corridor, 18ft. wide, runs the entire length of the building on each floor. The cells are ranged on each side of the corridor, 26 on each side, 52 on each floor, or 208 in all. Each cell measures 7ft. 6in. long by 4ft. 6in. wide and 7ft. 6in. high. Each pair of cells is lighted by a gas jet protected on both sides by glass 1in. thick. The refractory block contains eight cells, of which two are "dumb," being doubled lined and fitted with double doors. These cells are 7ft. by 12ft. and 9ft. 10in. high, and two exercise yards are attached. The infirmary contains kitchen, doctor's room, surgery, and two cells on the ground floor, with bath room, &c., the cells being 13ft. by 7ft. by 10ft. high. Residences for the governor and the married warders are erected outside the prison walls. The cost of erecting the prison was £32,000.

**PONTYPRIDD.**—The arcade about to be constructed in the centre of the town to plans prepared by Messrs. Taylor and Evans, of Cardiff and Pontypridd, will connect St. Catherine-street and the streets adjoining with Market-square. It will be perfectly straight for its whole length, which is about 240ft., the width being 12ft., and there will be an even fall towards Market-square of 1 in 36. The glass roof is to be constructed with patent zinc glazing bars, supported by cast-iron principals. A feature will be the provision of complete dwelling accommodation to each shop. There will be 28 shops of various sizes, ranging from 13ft. by 10ft. to 24ft. by 17ft. Six on the northern side, with shops 14ft. by 22ft., will, in addition, have a second floor, and will contain six rooms, as well as the shop and usual offices. Five will be provided with a back entrance to a lane wide enough for a cart, and ten will have a sitting or living room at the back of the shop on the ground floor. The buildings at the Market-street end will remain as at present, with the exception of the ground floor. The building at the St. Catherine-street end will be new, and be constructed of red brick with Bath stone dressings.

**SOUTHBOROUGH.**—A service was held at Christ Church, Southborough, on Friday last,

when the building, after its recent enlargement and completion, was consecrated by the Bishop of Dover. The church has undergone an addition, which completes the original design of the architect. The old building consisted of chancel, nave, and transepts, and two aisles have now been erected as a memorial to Col. and Mrs. Blackburne-Maze. The tender of Messrs. Punnett, of Tonbridge, was accepted by the building committee for £1,267. The building is of red brick, in the Gothic style, and the new part is built in harmony therewith. The inside measurements of the new aisles are 48ft. by 42ft., and are divided from the nave by arcades and columns, with carved capitals.

### ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

**ROYAL ARCHÆOLOGICAL INSTITUTE.**—On Friday the members of this body visited, from their headquarters at Leamington, Warwick, Kenilworth Castle, and Stoneleigh Abbey. On Saturday they proceeded to Coventry. They travelled thither, a hundred strong, by railway, and were received by Mr. W. G. Fretton, F.S.A., who acted as guide. Among the places visited were St. Mary's Hall, St. Michael's and Trinity Churches, the Benedictine Priory, and the site of the ancient Cathedral Church of Coventry, St. John's Hospital, the Collegiate Church of St. John, and the Bablake Hospital. At the evening meeting a paper by Mr. J. Alfred Gotch, of Kettering, on "Seventeenth-Century Houses" was read for the author by Mr. Walford. On Monday, the closing day, the members visited the mansion at Baddesley, Clinton, and Knowle, Solihull, Meriden, and Berkswell Churches, Mr. Fretton acting as guide.

**THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.**—The forty-third annual congress of this association was opened by the Bishop of Llandaff, the president-elect, on Monday night, at the Town-hall, Cowbridge. In the course of his address, Dr. Lewis referred to the many remains of all periods to be found within the Land of Morgan, remarking that, of the British period, perhaps the most interesting monument within the verge of their present resources was the vast cromlech near Duffryn, in the parish of St. Nicholas. It was, he believed, one of the largest, if not the largest, of the Druidical remains to be found in the kingdom. Passing from the British period to the Roman occupation, the president noticed some of those remains more immediately connected with the advent of the Romans, and then proceeded to remark on the remains of the many Norman and English castles which abounded in that and the neighbouring counties of South Wales. Many of the parish churches would be found interesting on account of their peculiar construction and the various styles of architecture; and he particularly referred to the church of St. Iltyd, or Llantwit Major. He also alluded to some recent discoveries at Cardiff Castle. Mr. E. Laws read a paper on "The Black Friars of Cardiff." On Tuesday the members went by road to St. Hilary, Old Beaupre, St. Athans, Fonmon, Penmark, Llan-cavan, and Llantrithyd. They met again at Cowbridge in the evening, when papers were read by Archdeacon Thomas and Mr. J. A. Corbett. The members visited on Wednesday the village of St. Bride's Major, and Ewenny Abbey, the residence of the Turberville family, a Benedictine Priory containing some of the finest Norman work in Wales. A meeting was held at Cowbridge Town Hall in the evening, under the presidency of the Bishop of Llandaff. Mr. Stephen Williams, of Rhyl, read a paper on "The Recent Excavations at Strata Florida Abbey."

**SOMERSETSHIRE ARCHÆOLOGICAL SOCIETY.**—The fortieth annual meeting of this Society will be held at Wells on the 28th, 29th, and 30th inst., under the presidency of the Bishop of Bath and Wells (Lord Augustus Hervey). The annual meeting is to be held in the Town Hall on the morning of the 28th, to be followed by luncheon at the Palace, after which the Palace, Deanery, the Vicar's Close, Hall and Chapel, the Canon's Barn and old Archdeaconry will be inspected. There will also be an evening meeting in the Town Hall. Wednesday's proceedings commence with an excursion

to Rodney Stoke, church and monuments of the Rodney family, Cheddar cliffs, caves, and church, and Wookey church and Manor House. Tea will be served at Somerleaze, the residence of Mr. E. A. Freeman, and in the evening a meeting will be held at the Town Hall, Wells. On the following day, Thursday, the members of the Society meet at St. Cuthbert's Church, in that city, and attend service at the Cathedral, which will afterwards be inspected. In the afternoon Pilton Church and Barn and Croscombe Church and early buildings will be visited, and the proceedings of the meeting close with a reception at the Palace in the evening.

### CHIPS.

The tender of Messrs. W. Grinson and Sons, of Leicester, has been accepted at £4,741 for the erection of a children's hospital in that town. Mr. W. B. Smith is the architect.

Competition drawings sent in by Mr. J. H. Dyson, of Batley, have been successful in obtaining the Corporation contracts for Paisley and Renfrew, which include altogether over five miles of street decorations and six triumphal arches, for the occasion of the Queen's visit to the above-named burghs on the 22nd and 25th inst.

A memorial stained-glass window has been placed in St. Stephen's Church, Saeinton, Nottingham. The chief subject is Our Lord blessing little children, and the spaces above and below are fitted with representations of Our Lord's baptism and the Last Supper. Messrs. Hardman, of Birmingham, were the artists.

The adjudications in bankruptcy reported in Tuesday's *Gazette* include the names of John Pearce Flew, Edith-road, West Kensington, builder; Arthur William Chapman, Bristol, builder and contractor; and Ebenezer Holland, Oxford, builder.

New schools erected for the Bangor school board at Glandada are on the eve of completion, and will be opened this month. Mr. Richard Davies is the architect, and Mr. Evan Williams, also of Bangor, the contractor. The schools have been fitted by Mr. E. H. Shorland with his patent Manchester grates.

A new organ, built by Messrs. Conacher and Co., of Huddersfield, was opened on Sunday at Tong-street church, Dudley-hill, near Dewsbury. The case is of pitchpine, and Gothic in character, and was designed by Mr. George Ogden, of Huddersfield.

Arrangements have been completed for the erection of a memorial chapel and school-room at Epworth, Lincolnshire, the birthplace of John and Charles Wesley. Mr. Charles Bell, of London, is the architect, and Mr. Hy. Kelsey, of Epworth, is the contractor. The site is on the west side of the Temperance Hall, fronting the main street.

The Sussex Archaeological Association, which has its head-quarters at Lewes Castle, held its annual meeting and summer excursion on Thursday in last week, and visited Bayham and Sotney Castle. Mr. W. H. St. John Hope, F.S.A., read papers at the former mansion.

The parish church of Clifford, Herefordshire, was reopened after restoration last week. The plans were drawn by Mr. Evan Christian, of London, and the work was carried out by Mr. Henry Smith, of Wolverley, Kidderminster; the cost was £1,350. The galleries which formerly existed at the west end and sides have been done away with entirely. The outside walls have been repaired, and the nave and chancel re-roofed with red tiles. The chief alteration is the addition of a north aisle, the roof of which is supported by oak pillars. Instead of the old whitewashed walls, the internal walls are lined with freestone dressings, and the oak woodwork of the roof of the nave, which had at the last restoration been shut off from view by lath and plaster, has again been brought into prominence. The pulpit is of oak, and the body of the church is seated with open pews of the same material, the remainder being filled with chairs. There is a chancel screen, also of oak, and a vestry has been provided on the north side, the partitions being of a like material. The nave is paved with wooden blocks.

A morning chapel, organ-chamber, and vestry are about to be added to the north side of All Saints' Episcopal Church, Edinburgh, from plans by Dr. Rowland Anderson, of that city. The style will be Early English, in keeping with the existing building. There has just been completed the carving of some capitals in the nave, included in the original design.

Mr. James McNeil Whistler, the painter, was married at St. Mary Abbots, Kensington, on Saturday, to the widow of Mr. E. W. Godwin, F.S.A.



TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.] It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 333, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions. Cheques and Post-office Orders to be made payable to PASSMORE EDWARDS.

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RECEIVED.—G. A. W. and Son.—C. G.—J. F.—J. and Son.—F. M. and Co.

"BUILDING NEWS" DESIGNING CLUB.

V. STAINER, Folkestone, RALPH GLADMAN, AN OLD MEMBER, AND OTHERS. (The club will not recommence till after the holiday season; but due notice will be given and the lists of awards will be printed in due course.)—F. CHUBB. (The last sheet of the present series is published this week. Yes, we are open to receive suggestions for the new session, and any serious proposals will be welcomed. Like all good things, our club has had imitators. Never mind, try again.)

Correspondence.

THE R.I.B.A. AND ITS BLACK SHEEP.

To the Editor of the BUILDING NEWS.

SIR,—Is it not high time a prompt action was taken by the Council of R.I.B.A. to publicly dismiss the architects from the Institute who have disgraced themselves in connection with the Board of Works scandal? If not, I fear a blot will rest on the Institute, and many will wash their hands of the Fellowship.—I am, &c.,

H. K. AMSDEN, LL.D.

de Ferns, Richmond.

It is said that at their last meeting the Council of the R.I.B.A. expelled two of the individuals concerned, and severely reprimanded another. No official intimation of the action has reached us, and the above must, therefore, be taken with all reserve. We also hear that one at least of the gentlemen implicated has no means disposed to submit to what he considers exceptional treatment, and that early in the ensuing session it is possible that the Council may be invited to take similar action with regard to other members whom it is alleged have equally disregarded its rules. It also may, of course, be mere gossip.—ED.

PRIESTLEY v. STONE.

SIR,—As the most complete report of the important case of Priestley v. Stone appeared in your journal, perhaps you will allow me to point out that the decision of the Court of Appeal was the necessary result of the practice at present adopted by the building trade. Under the present system the quantity surveyor does not, in fact, make any contract with the builder that he will use due care and skill. He is not, in fact, retained or employed by the builder before he takes out the quantities. He does not make any express statement or representation to the builder that his quantities are correct; and he does not enter into any undertaking or guarantee that they are correct.

If the builder wishes to make the quantity surveyor liable to him, he should insist upon an undertaking being signed by the surveyor, and inserted at the foot of the copy of the quantities upon which he tenders. The undertaking might be in some such terms as these: "In the event of your tender being accepted for the above-mentioned works, I hereby (in consideration of your paying me 1½ per cent. on the amount of your tender and £— for lithography) undertake and guarantee that the above quantities correctly state the amount of work and materials necessary for the completion of the said works according to the plans and specification signed by the architect, and I agree, in case the said quantities are found to be deficient, to pay you the value of the work and materials omitted."

There is one other course which the builder may adopt to protect himself against short quantities. He may insist upon the quantities being made the basis of his contract with the employer. This was the course recommended by Mr. Justice Stephen in his judgment in Priestley v. Stone; and I can testify, from my own experience, that if the contract is properly drawn so as to practically make the employer guarantee the correctness of the quantities, the builder has an ample remedy against the employer for any deficiency.—I am, &c.,

ARTHUR H. SPOKES.

CHURCH RESTORATION.

SIR,—In your remarks on my "essay" on church restoration, you have partially mistaken my meaning. I suggested that those of us ("whose opinion is worth having") should determine some general rules and principles which should be as far as possible made obligatory on those to whom a work of restoration is intrusted, while other questions might be left to opinion. Our paper of "suggestions" can now be either ignored or rendered perfectly useless in the hands of some men who suppose themselves to be "church architects." And in their case, the only way, at present, in which some practical check can be kept on their vagaries, is by the Church Building Societies refusing all aid to any plans reported against by those appointed to examine them.

With regard to criticisms from all sides, they are, of course, to be expected; but while the architect should be by force of character the leader of any work intrusted to him, he may surely be willing to accept good advice; for it is only those who have unbounded confidence in their own superiority to all others who do not occasionally ask for and receive with pleasure the advice of those fitted to give assistance on any special points.

I mean, to give an ancient example, in any such case which might arise, such as "Street" describes about Gerona Cathedral. It was there that a "penta" of the great architects of their day were asked to advise with the designer of the intended new nave. "Street" gives us all their various opinions, and we see the magnificent result of their united deliberations in that grand vault, which is almost without a rival in Europe. We learn, too, from the opinions, that they were no random suggestions of the peculiar taste of the individual, but that they were founded on certain definite and accepted rules and principles, which were quoted by each man as "reasons" for his opinion.

If in our own day we were to try and follow the lead of these old Spanish architects our buildings would decidedly gain, and there would be more of the good feeling and respect for each other's opinion that there ought to be amongst the leaders of the art of architecture.

Moreover, the general public would, without doubt, respect and believe in us more than they now do, at the sight of more willingness to help each other, and why should we not, as in the days of Ghiberti, ungrudgingly (as his Florentine rivals did) admit any undoubted triumph of genius? But, as I think that any such triumph is more likely in the case of a new building, than of any addition in a "19th century style" (so-called), to an ancient building, I cannot bring myself to accept your argument of Rouen Cathedral as being anything but a source of danger and a risk which is better avoided.—I am, &c.,

R. HERBERT CARPENTER.

4, Carlton Chambers, Regent-street, Aug. 11.

STRAINS.

SIR,—Absence from home has prevented my replying earlier to Col. Seddon's letter in your issue of the 3rd inst.

He states my case concisely in his concluding remark, that "each blade of the scissors represents the vertical resultant of all the forces acting on its side of the section under consideration," and in admitting that such a resultant exists, met by an equal and opposite resultant, he admits the existence of shear. In the centre of a beam carrying a distributed load, the resultant of the downward vertical forces is the proportion of the weight carried on the right side of the beam, which is supported by the left-hand abutment, plus the proportion of the weight on the left side of the beam, which is supported by the right-hand abutment. This resultant, which is equal to  $\frac{W}{4}$ , is met and equilibrated by a similar force acting upwards—viz., the sum of two reactions attempting to reach the loads to which they are due.

The theory to which Col. Seddon pins his faith depends upon the idea that reactions are met and equilibrated by the first loads they meet instead of those to which they are due, whereas effects must travel to their causes.—I am, &c.,

G. A. T. MIDDLETON.

SWINDLING ARCHITECTS AND BUILDERS.

SIR,—There is an individual living in Birmingham who is doing a big business in the swindling line among architects and builders. This person called on me some three months ago, represented himself as a traveller for a firm of oil and grease merchants, and said that he lived at Leicester, where he owned two houses; that he was going to leave the firm he was with and going to commence business on his own account, and wanted to build two houses here to cost £2,000. To shorten a somewhat long story, I will here say that I have prepared plans, specifications, and quantities for two houses to cost about this amount. This man came to see me on Tuesday morning, saying he had just come down from London. He travelled about all the week, was in Birmingham several times during the week, and asked to have letters addressed to the Hen and Chickens Hotel. He was in a very great hurry to begin building, but a hitch occurred. The land agent from whom my friend wanted to lease a piece of land asked for references: these turned out unsatisfactory. Then my client took to writing letters, asking me to send him the plans. I asked for money on account. Since then I have seen nothing of my client. I have made a lot of inquiries, and ultimately I went to the detective office at Birmingham. The detectives recognised the man directly from the description I gave, and told me that he had been doing the same thing in Leicester, Leamington, Nottingham, and other places, but that they could not get anyone to prosecute. He got a builder to commence building two houses near Birmingham. When £800 worth of work was done the builder asked for money; a surveyor's certificate certifying for £750 was obtained, and a firm of solicitors advanced £500 to my client. The builder has not had a farthing. I know of other similar cases. Different names, trades, and professions are adopted by my friend in different towns. I have no doubt but that some architect or builder is being "worked" at the present time. If this letter should come under the notice of anyone who is engaged by a stranger, who tells a plausible tale, to prepare



plans, and this should arouse their suspicion, I shall be glad if they will communicate with me at once. I am particularly anxious to have a few minutes' interview with my late client.—I am, &c.,  
JON. ELLIS.  
6, Bridge-street, Walsall, Aug. 15.

#### ARCHITECTURAL PLAGIARISM.

SIR,—In the sister arts of sculpture and painting there is a little word constantly made use of which literally is of little significance, but in the creative artistic sphere speaks volumes. I have in my mind the word "after."

For instance, in painting, an artist treating a landscape subject is largely influenced with the ideal conceptions and mannerisms of a well-known leading artist in that species of composition; but, instead of purloining his ideas, grouping, colouring, &c., and passing them off as his own, the fraud being somewhat too palpable, he immediately and decorously styles his composition "after B. W. Leader, A.R.A.," and nobody's susceptibilities are wounded.

I notice an erection in this neighbourhood, the architectural details of which are to be found at St. Paul's Schools, Hammersmith, the Natural History Museum, South Kensington, and the National Liberal Club respectively. Now, why did not the designer of this edifice say at once "after A. Waterhouse, R.A.," and have completely done with it, if his own ideas possess no self-entity, no individuality, and he was therefore compelled to base his design upon other leading compositions?

It is painful indeed to continually observe these unchecked acts of piracy on the high seas of thought.—I am, &c.,

CHAS. R. GUY HALL, A.R.I.B.A.  
12, Lower Phillimore-place, Kensington.

#### BARFRETON CHURCH.

SIR,—Taking, like many others, much interest in the little Norman church at "Barston," and alarmed by the reports relative to injurious alterations intended to the structure, I went down to the place to see for myself what the truth was. The church is such a perfect gem, and knowing what so-called "restoration" has done, and is still doing, elsewhere, I was extremely anxious for the safety of my favourite.

On calling at the parsonage, and sending in my card, after awhile the professional curer of souls made his appearance with the abrupt and rudely-mannered interrogation, "What do you want?" "Good morning, sir," quoth I. "I am come to see your beautiful little church, and shall be glad to know what are the intentions of its restorers." "You shall not see the drawings," was the reply. "I have been much bothered by people writing to me, and coming to see the drawings, and then going and writing to the papers; I think it most intrusive and presuming for people at a distance interfering with what is simply a parish affair." "I beg to submit, sir," said I, "that the church is one of such great interest, that its safety is rather a national than a purely local matter." "You shall not see the drawings," reiterated he. "You are all ready with advice, but I do not find you willing to give anything else. One letter I received was especially modest—was it yours? Ha, ha! I call it modest, but I mean just the reverse. I shall not show you the drawings; I will only show them to people of the place." This and more was stated with offensive manner, so I advise visitors hereafter to avoid the parsonage, especially if they are "young fellows," or belong to the Society for Preservation of Ancient Buildings, who are especially obnoxious, it seems.

Not having seen the drawings, I cannot say how far the statements are correct as to the pulling down the west wall, and rebuilding it with a turret and chimney, &c. Considering how well the church is built, the pulling down any part of it would be utterly inexcusable. If a bell turret is necessary, it would be better to have a wooden one on the roof and leave the walls intact, and it certainly is not the proper place for a chimney. As to the opening through the wall of the arched recesses at sides of chancel-arch, which were only intended as ornamental panels, this would be a gross vandalism.

But, nevertheless, there are useful and proper things requiring to be done—such as opening

the roofs; the removal of the pulpit from the middle of the west wall, where it is at present, to the north-east end of nave, and the reduction of its size; the providing benches to face eastward instead of the seats now looking north and south; and, for the sake of decency and general usefulness, the building of a small vestry with heating chamber under the chimney on vestry wall. At present a part of chancel serves as vestiary, a thing few would defend. The church possesses the remarkable feature of a solid stone altar. I was assured it was old; but examination convinced me of the contrary. The clumsily moulded top or Mensa was in two pieces, and without the fine crosses which distinguish old altars. I should say it was same date as the stone pulpit, and both modern; though it is very singular a stone altar should have been erected in modern times.

The illustrations of the church in "Britton's Antiquities" are not very correct. Britton shows the walls as being altogether of ashlar stone, whereas the lower half is faced with flints. Since the "Antiquities" were published the roofs have been renewed, and the enlarged cusped lights in chancel restored to their old form.

The dressings are of Caen stone, which in modern times has proved so worthless, yet here is in excellent condition. The building of the church is generally attributed to Hugh de Port, who held the manor 1081; but the style plainly proclaims it to belong to the middle of the 12th century when the style verged on the "Pointed." I should think it was executed at same time and by the same builder as the neighbouring church of Patricbourne, to which it bears some resemblance. This latter church belonged to the Priory of Beaulieu in Normandy in the end of the 12th century, and by which house it was probably built. They both show the hand of an accomplished designer. The east end of Barfreton is a choice specimen of enriched design. At lower part of wall are two arched recesses, supposed to have been intended for sepulchre, but I should say were only ornamental. Over these is an enriched stringcourse; then comes an arcade, part pierced for windows; then over is a rich corbelled stringcourse or cornice terminating at each end with a bold corbel, on which is a seated lion. In the gable is the remarkable wheel-window—shown in Parker's "Glossary"—flanked by carvings of the Four Evangelists (one gone), and on either side niches. The one to the south has in it, on a pedestal, a Norman knight on horseback; the other niche has the pedestal, but the figure is wanting. On the south side of chancel a niche of the arcading has a bas-relief of St. Michael slaying the Dragon under an embryotic trefoil canopy, and the idea is suggested that the other panels also were intended to hold sculpture.

The tradition is that the church was built by a Norman knight, who was fond of hunting, and who thus was thrown from his horse and his life endangered, and that this church was a thank-offering on his recovery, but he hunted no more. Whether the numerous carvings of knights, and especially of those hunting, as shown on the medallions of south doorway, are a confirmation of this story, or only the originating idea of it, is a question.

Two churches in Kent all students of architecture should see—viz., the "Stone" beauty near Dartford and this at Barfreton. This latter is reached by the Chatham and Dover Railway, the stopping place being Shepherd's Well.—I am, &c.,  
M.

#### FLUSHING PIPE FOR BATH.

SIR,—For those of your readers who take a hot bath and like to turn off the dirty water and leave the bath clean, may I suggest the putting a  $\frac{3}{4}$  in. flushing-pipe (connected with the cold-water supply) all round under the bath top, with holes drilled in the pipe at the side towards the bath 2 in. apart, in the manner of the flushing-pipes to the public urinals. By means of a stop cock the bath can be flushed out immediately after the dirty and soapy water has run off, instead of the dirt and soap, which adhere to the sides of the bath, being allowed to dry on, and, with great difficulty, rubbed off by the housemaid next morning.—I am, &c.,  
CHARLES F. MOXON.

#### GREASE-TRAPS.

SIR,—I had occasion a short time since to take up a tin. stoneware drain from a scullery sink. The waste-pipe from sink discharged into an ordinary grease-trap; but this had not been emptied regularly, and the drain was completely choked with grease which had cooled in its passage.

It seems to me that a grease-trap when not emptied aggravates the evil; if this is so, and, if, as I am told, "grease-traps are not often emptied," it is a question if they are such good things as they at first sight appear.—I am, &c.,  
CHARLES F. MOXON.

#### A CORRECTION.

SIR,—Seeing your report, in the BUILDING NEWS of Aug. 3, of the National Competition of Schools of Art, I find you have made an error in naming the church of my measured drawings. I should be "Norton Fitzwarren Church" (recharge screen). Please correct the same in your next issue.—I am, &c.,  
W. FUGE,  
3, Stanley-terrace, Taunton, Aug. 14.

#### STAINED GLASS.

ACTON.—A three-light window in St. Dunstan Church, East Acton, has been filled with stained glass to commemorate the Queen's Jubilee. The work, which represents the Crucifixion, is from the studio of Messrs. Powell Bros., of Leeds.

DRIGHTLINGTON CHURCH, YORKS.—Stained glass has been inserted into one of the aisle windows as a memorial of some members of the Hudson family. The work represents the Act of Mercy, and it has been designed and executed by Messrs. Powell Bros., of Leeds.

#### WATER SUPPLY AND SANITARY MATTERS.

MACCLESFIELD SEWERAGE.—The local board of this town lately advertised an open competition to civil engineers for the best scheme for the interception of the sewage now flowing into the river Bollin, and its purification by the best known method. Mr. W. H. Radford, Assoc. M.Inst.C.E. of Nottingham, is the successful competitor. His scheme is to lay six miles of intercepting and outfall sewers to collect the sewage now flowing into the river, and convey it to an outfall below Prestbury. He then proposes to purify the sewage by irrigation on 159 acres of suitable land, specially laid out and drained for the purpose. The manufacturing refuse, consisting chiefly of soap-suds and dye-water, is also proposed to be dealt with. The population is 39,000, and the estimated cost of work only, without land or easements, is £23,750. Mr. Radford was also lately the successful competitor for the sewage schemes of Newhaven and Beacomthorpe.

#### CHIPS.

The work of restoring the church of St. Peter at Driffield, from plans by Mr. Temple Moore, F.R.S.A. of London, has been intrusted to Messrs. Shepherdson and Son, of Driffield.

The Jubilee hall at Malpas was opened on Tuesday week. The building has cost £1,100, situated in the High-street, and is of half-timbered construction. The chief room on the first floor measures 57ft. by 25ft., and seats 300 persons. Mr. Walter Webb, of Whitechurch, Salop, was the architect, and Mr. Thomas Huxley, of Malpas, the builder.

On Saturday Lady Frederick Cavendish laid the foundation-stone of a new higher grade school at Barrow, which is to be built by the School Board at a cost of £7,000, and which, when completed, will accommodate nearly 1,000 students. Accommodation will also be provided for technical instruction. A banquet was held in the town hall to celebrate the event, and also the unveiling of marble bust of the Queen, the gift of Sir James Ramsden, which has been placed in the town hall.

At the monthly meeting of the West Hartlepool School Board, held last week, it was unanimously agreed to carry out the designs and plans submitted by Mr. G. G. Hoskins, F.R.I.B.A., of Darlington for the Lynnfield schools, to accommodate 1,000 children.

On Thursday, the 9th inst., Lord Wolsley unveiled a series of stained-glass windows which have been placed in Rochester Cathedral by the Royal Engineers, in memory of officers of their corps who have served in the Peninsula, at Waterloo, and the Sudan. The windows have been erected immediately above the tablet which commemorates Charles Dickens and his associations with the ancient city, and form two tiers of lights.



Intercommunication.

QUESTIONS.

[9712].—Theatre Exits.—Can anyone inform me as to the result of an observation made as to the number of people that passed through a door of a theatre a given time? This appeared in some journal or paper a few months ago, I believe.—EXIT.

[9713].—Widening Bridges.—I shall be obliged if one of your readers experienced in the construction of old bridges will inform me whether, in widening such a bridge over a river, the new work should be tied into the old or built without ties to allow for settlement.—OUBIFUL.

[9714].—“Redcot,” Knock, Belfast.—Would the author of the above design (or any other reader) kindly plain the method of construction and means of support the angle over the oriel window, as I presume a pillar could not be admissible, and oblige?—A PROVINCIAL SADER.

[9715].—Western Towers.—Are there any examples to be seen near London of old western towers opening to the nave?—STUDENT.

[9716].—Load upon Roof Truss.—At what points could the load be distributed, and how is it composed? Any particulars will be received thankfully by—T. E. R.

[9717].—Fence.—Can an adjoining tenant call upon its neighbour to repair a railing which is in a bad state of repair and belongs to him? How can an aggrieved party act?—A TENANT.

[9718].—Characteristics of Masonry.—What are the characteristics, if any, of 12th-century masonry? Are the mortar joints wide, and what is the general kind of mortar used? Do the joints and stone-laying differ at all from the work of the preceding century?—U.

[9719].—Easter Sepulchre.—Can any reader tell me in what position this generally stood?—U.

[9720].—Renewing Old Plaster.—Will any of our readers kindly tell me any way in which I can treat old used plaster (models, &c.) so as to use it again as before?—AGNEW.

[9721].—To Estimate Brickwork.—Are there any tables to be had for estimating brickwork by simply multiplying the area by a multiplier for any thickness? The ordinary methods used by surveyors are tedious to the poor people, as it becomes necessary to reduce the various thicknesses of walls to  $\frac{1}{2}$  bricks, and then divide by 2, which is laborious. Thus, in a  $2\frac{1}{2}$  brick wall it is necessary to multiply the superficial by 5 to bring it into  $\frac{1}{2}$  bricks, and divide by 3 before the final division is made, or to have two columns, one for  $\frac{1}{2}$  brick walls and one for brick walls, under which the quantities are placed. The latter is the usual and easiest plan, as under two columns for one brick and  $\frac{1}{2}$  brick, any thickness of wall can be abstracted. For one-brick walls the reduction to  $\frac{1}{2}$  standard thickness is made easily by multiplying the area by 2 and then dividing by 3; but then the independent division by 272 has to be gone through.—G.

[9722].—Sheet-Iron Chimney Shaft.—In designing a chimney shaft for a district where the atmosphere is free of any acids from surrounding manufactories, I have decided to use sheet iron, on account of its much lower weight on foundation as compared with masonry; but whether I should have steel or iron plates is a consideration. I have procured a “Bancroft’s Flat Chimney Shaft” (construction) from seeing it noticed in the BUILDING NEWS as one of the best hundred technical books, and in examples there given I find this method of construction has fairly passed the experimental stage, but would like the opinions of your correspondents as to the comparative durability of steel and iron. I may add that I have estimated the cost of painting iron every ten years against the first greater cost of masonry, taking into account the interest on my calculations, but should like to have the opinions of your correspondents on this point.—IRON CHIMNEY SHAFT.

REPLIES.

[9723].—Shingled Spires.—Shingles were from 8 in. long, and 4 to 6 in. wide, and an inch thick, tapered to one end and fastened to rough boards by pins. In the 12th century stone shingles were commonly used. Water-tel oak shingles have lasted for half a century in Normandy several houses are shingled. The Salisbury Cathedral was covered with wood shingles at the period out from the New Forest. I am not acquainted with any ancient example of a shingled spire, though there are three spires in Hampshire, Nursling and Highclere church, have structures covered with wooden shingles that have stood well.—G. H. G.

[9724].—Acoustics.—No specific rules are followed by architects, though square corners, high roofs, and reflecting surfaces are to be avoided.—G. H. G.

[9725].—Acoustics.—In reply to “Architect,” I would say that the limits of comfortable hearing space are as follows, as proved by experiments:—In front of the speaker, 75 ft., and 50 ft. on each side of him. The wall of the orchestra or platform should be elliptical on plan; the reason for this being that sound should never be at a plane at right angles, otherwise it will be reflected as an echo. The same rule applies to the ceiling, and should be horizontal. The parts adjacent to the walls should be brought down in a curve. Further, the plane of the wall facing the speaker should be broken up as much as possible, as by recessed doors and windows, projecting gallery, columns, &c., as they tend to disturb the sound waves and so prevent them from being reflected. Avoid all projecting surfaces on the side walls, as they afford so many shields, as it were, to ward off the sound in another direction. With regard to curtains, &c., still, none at all, as they tend to absorb the sound and produce a deadness of feeling fatal to all music. Over the dimensions of the hall be, avoid a large space overhead, for it will absorb part of the sound and turn the rest in the form of an echo. The floor of the hall can be slightly inclined with advantage, but this is only necessary for the purpose “Architect” states.—J. NIEL.

[9697].—Haddon Hall.—Details of woodwork of above are to be found in “B. N.” for April 2 and 16, 1875, and sketches of portions of the building in “B. N.” for July 6, 1883; Oct. 5, 1883; July 11, 1884; and Feb. 11 and 18, and March 11, 1887.—S. S. P.

[9699].—Refectory.—An apsidal-ended refectory is not to be seen in England. The refectory was often placed on the south side, and was connected with the kitchen. At Netley it is below the dormitory, and is placed on the east side; the same position is found at Durham and other places.—G. H. G.

[9700].—Quality of Woodwork.—The extract “Fairairton” gives from “Gwilt’s Encyclopedia of Architecture” belongs to a by-gone age, and is wholly out of place at the present time. “The timber to be of the best Dantzic, Riga, or Memel yellow fir” means that all unwrought wood in a building shall be cut from hewn timbers shipped from one or other of these ports, as was the custom at the commencement of this century. To carry out such a system now would about double the cost of the timbers in work, especially so if cut free from sap, which would be possible if the dimensions were not large. The mention of “yellow fir” shows that the specification was framed in London or in south of England, for in all other parts of the kingdom it is called “red fir.” The exclusion of timber from Scotland reflects the old days when wood shipped other than from our colonies was a taxed commodity, and paid duty at the port of landing—a time when it was possible for the native timber of Scotland to compete with that of the Baltic, a state of things that has not existed for the last half-century. The exclusion of American fir was natural, as it meant the Canadian spruce of our day, which does not hold a very high position as a building timber, although largely used in London and along the West Coast of England. The exclusion of “Swedish fir” meant hewn timber of that shipment, a soft species of firwood roughly hewn and made, coming to hand with the natural taper of the tree preserved in the log. It did not refer to the high-class shipments of sawn planks, deals, and battens, which form the staple of the trade to-day, for they were then unknown. There is certainly a good deal of American timber now used in building. I give a note of this in the case of spruce, as above; but pitchpine timber from the United States is a prominent instance. This wood, from its size, its high quality, splendid manufacture, and low cost, finds its way to every town and village in the land. Before this timber the older shipments from Dantzic, Memel, and Riga have had to retire, and such has been the rapidity of this retrograde movement that in a few years it is probable that they may disappear altogether. “Fairairton” will, from the above, be prepared for my remark that the above clause from Gwilt’s “Encyclopedia” is not now generally applicable, and that it ought to be modified. The manner in which it should be modified depends upon the character of the building of which the timber is to form a part and to the locality in which it is to be erected. It might be described that all heavy timbers—say, those having a greater width than 11 in. and a greater thickness than 4 in.—should be of such timber, or of pitch pine. The architect in the latter case being assured in his own mind of its durability, all light timbers might be described of the same wood or of good or given shipments or marks, of Swedish or Finland sawn planks, deals, and battens. The latter, owing to the enormous saving in cost to the contractor, would most certainly be used. If the timber was the “best” of its several kinds it would be practically free from shakes, large knots, and other defects, and such a description following would be superfluous, more especially in connection with the smaller timbers cut from Swedish or Finland sawn goods. It is very rarely, indeed, that the best quality of the latter goods are used for timbering purposes, as the second and even the third qualities are good enough for all ordinary purposes. In practice it is a fact that an enormous volume of sawn goods, of qualities and brands inferior to the above, pass into consumption, and that they form the staple of the carpenter of to-day. The reservation of “best” might be adhered to with regard to the larger timbers; but if rigidly enforced the short average lengths of this brand of good might offer a difficulty. There is no such thing as building wood being entirely free from sap. No qualities or brands are selected with this view—it would be better to allow some latitude in this direction. For instance, it might be stated that the sap should not encroach on the edge of any piece of timber above one-half or three-quarters of its thickness. In the case of pitch-pine timber, it is much less difficult to obtain the wood free from sap than in the case of Baltic timber, Memel timber, the toughest and most durable of all, being especially subject to this imperfect and perishable wood.—W. STEVENSON, The Park, Scarborough.

[9704].—Employers’ Liability Bill.—This Bill stands over until the autumn session, and so it may be much amended before becoming law; but if an accident happens to the workman of a contractor by reason of a “defect in the condition or arrangement” of the plant or machinery which is provided by the owner, and which is not discovered or remedied through the negligence of that owner or his foreman, then, as the Bill now stands, the owner will be liable as if he were the actual employer of the workman.—F. W.

[9706].—Honours Exam. in Building Construction.—“Veritas” will possibly find all the assistance he requires from “Simple Practical Methods of Calculating Strains on Girders, Arches, and Trusses,” by W. E. Young (Macmillan), which is free from “difficult mathematical calculations” as is possible, and for practical demonstration I do not know that he could do better than refer to “Building Construction” (Rivington). If he refers to your issue of Feb., 1888, he will gain valuable information upon the elementary consideration of girders.—GEORGE WM. USILL, Assoc. Mem. Inst. C.E.

[9709].—Belgium.—I have spent two holidays in Belgium, and if the tastes of “Iota” run in the direction of quaint cities, galleries of old and modern paintings, grand town halls, spacious churches of the 15th, 16th, and 17th centuries, carillon music, or pastoral scenery, he has a rich storehouse to explore in that little country. The characteristics enumerated are best seen in Flanders; if he wishes for hill scenery and a tinge of Teutonic rather than Flemish influence in the people, buildings, and surroundings, a few shillings and two or three more hours spent in a train will take him to Namur or Liège. The first trip I made to Belgium was in 1873, when I took the Great

Eastern Railway route via Harwich to Rotterdam, returning by Antwerp. A month since I revisited the country, and decided to try the General Steam Navigation Company’s boat, which proceeds direct from Irongate Wharf, E., to Antwerp. Travelling with a companion, we exhaustively did the sights of that city, and visited Malines, Louvain, Brussels (where we stayed four days, one of which was devoted to a coach-ride over the field of Waterloo), Ghent, Bruges, and so back to Antwerp. In each town we went up the tower of the cathedral or Town Hall in order to gain a bird’s-eye view of the place and its neighbourhood, and so triangulated with field-glass the whole of the limited and flat area we visited; at least, two other spires, already seen, or to be afterwards inspected, being visible from each point. We visited the museums, churches, town-halls, and, indeed, all buildings and places set down in guide-books as worthy of note; while, by restricting our tour to a small compass, we were able to “do” that little district thoroughly and pleasantly. French is spoken by the middle and upper classes, and English in the hotels and some shops; but, except in Brussels, the lower classes speak Flemish and a few words of French. Two persons can carry out such a trip more economically than one, as the aid of a concierge has to be sought to see the interior of many buildings, and then a franc is thankfully accepted from two where a half-franc would not go down from the single visitor. Most of the pictures worth seeing in the churches are veiled, except on Sunday mornings during service, and a fee must be paid the sacristan to draw the curtain. Hotel charges are much lower than in England, railway fares are the lowest in Europe, with a sensible reduction on return tickets, and a trip can be carried out very cheaply. Waterloo is reputedly the expensive item in the programme, but the whole outlay per head of a party does not exceed twelve francs, luncheon excepted—eight francs for coach, including driver, a franc to guide, ditto to visit the Cotton Museum, and half-franc each for the church at Waterloo, the farmhouse at Hougomont, and the keeper of the Lion Mound; and ten shillings would not be considered dear for a twenty-four miles drive through the Parc de Cambrai and Forest of Soignes, even without the historical interest of the field, although the paved roadway is execrably jolting. At Antwerp the west front of the Cathedral is undergoing restoration; the old details are being faithfully reproduced, but at present the new masonry is glaringly white. The unfinished south-western tower, the buttresses of which are in a threatening condition, is being refaced in stone and strengthened. The fountain in front of the Hotel de Ville, replacing the Tree of Liberty which died, is a bold representation of the slaying of the Brabant giant; the conception is bold but coarsely executed, and the effect of water gushing from the severed trunk, head, and wrist of the monster is repulsive. The group forms the apex of a cairn of large stones rising directly from the pavement of the Grande Place, having no trough or basin to inclose it. At Louvain, besides the town hall and church of St. Pierre, one should visit the less-known University, which contains a good collection of paintings, chiefly modern portraits of benefactors and historical scenes, and a large library. The building itself, formerly the Halles, contains some good 14th-century stonework. At Brussels, the new Palais de Justice, designed by M. Joseph Poelaert, which has been in course of erection since 1866, and is yet unfinished internally, will repay careful study and comparison with Street’s work in the Strand. The Brussels building has the advantage in site, being placed on a plateau overlooking the city; the outline is compact and effective, but the mixture of all Classic styles, from Assyrian to the newest Renaissance, is distressing; the central dome is not sufficiently massive to form a crowning feature to so lofty and imposing a pile, there is a uniformity in the planning and details of the courts in marked antithesis to our Law Courts; and the proportions of the central hall, so far as they could be judged in the maze of scaffolding, are too lofty and narrow to give satisfaction, although the arrangements will be more convenient than those of our Law Courts. Opposite the unrivalled Hotel de Ville an immense pretentious building is being cleared of scaffolding, in which the characteristics of the town hall facing it, and those of Louvain and Bruges, are reproduced with some dexterity, but the effect is too “busy.” A new Post-Office near the Theatre de la Monnaie is being roofed in, and will afford more ample accommodation than the present one, a desecrated Dominican Church; the style of the new building is Free Renaissance, and M. de Curte is the architect. At Ghent the Hotel de Ville and Cathedral are undergoing external restoration. The Gothic portion of the former building was scraped down sixty years ago, and is now being retouched; the south transept of the cathedral is being purged of Renaissance details, and the interior of nave is partly blocked up by scaffolding for the removal of whitewash from walls and the completion of the south triforium. Bruges, even more than Ghent, is a city of brickwork; the celebrated Belfry (which, although picturesque in outline, is too lofty for the Halles to which it is attached, and like the tower of the Hotel de Ville at Brussels, is not centrally placed), the cathedral (which has a hideous modern castellated tower) and the great church of Notre Dame are of brick; but neither here nor anywhere else in Flanders could I find an example of “Flemish” bond in old or modern brickwork; all was English bond. To “Iota” I would say: Take as little luggage as possible: a guide-book—my friend and I had two, the one Baedeker, the other Murray, and exchanged notes; and opera or field-glasses are indispensable additions to the necessary linen and change of clothing. I may add that I left London Bridge on Saturday, July 14th, and returned on the Wednesday week, the 25th; we lived well at hotels, with two meat meals per day, freely utilised trams and rail, and never grudging a fee to see anything of interest. My expenditure (as previously estimated) for the eleven days, including first-class steamboat passage (26s.), and third rail, was exactly £7.—EAST ANGLIAN.

The members of St. Alban’s Archaeological Society visited last week Wheathampstead Church (the tower of which is now being restored by Mr. J. O. Scott), under the guidance of Canon Davys, and St. Paul’s Church, Walden, where Mr. S. Flint Clarkson acted as cicerone.



## LEGAL INTELLIGENCE.

**SIMPSON V. NEILL.**—WHAT IS A "CERTIFICATE"?—(Liverpool Assizes, Aug. 10, before Mr. Justice Grantham.)—This was an action by the plaintiff, Joseph Simpson (trading as Simpson and Co.), Darlaston, who was the chief contractor for the Liverpool Exhibition building in 1886, against Messrs. Neill and Sons, Manchester, to recover £7,000 for work and labour done as sub-contractor for the defendants at the new Liverpool Exchange Station of the Lancashire and Yorkshire Railway Company. The question for his lordship was as to the construction to be placed on terms in the agreements between the parties. The defendants were the contractors for the new Exchange Station, and the plaintiff sub-contracted with them to do ironwork. As regarded the present action, all the matters in dispute between the parties had been narrowed down, and the question for his lordship was whether a certificate from the railway company's engineer as to the work being done was a condition precedent to the plaintiff recovering the amount claimed; and whether a document put in was such a "certificate." The company's engineer (Mr. Hunt) had certified that the amount due by the defendants to the plaintiff was £2,100, and it was argued for the defendants that the engineer's certificate now produced was conclusive in the action as to the amount which could be recovered by the plaintiff, but the plaintiff must obtain a certificate himself. All disputes between the contractor and the company were to be settled by the appointed arbitrators, Sir John Hawkshaw and Mr. Sturges Meek, and in the agreement between the plaintiff and the defendants it was stated that the arbitration clauses applied. The defendants replied that the plaintiff in the present case could not appeal against the company's engineer's certificate as to the amount to which he was entitled for work done. The defendants paid this amount into court. The plaintiff asked his lordship to say that the document produced was a sufficient certificate to enable him to go to the arbitrators to have settled the final amount which he could recover. His lordship said it was a strange thing that in cases of large contracts it invariably happened that some loophole was left in the documents for a legal question to be raised. So far as the certificate put in was concerned, it was a certificate on which the plaintiff could rely as a certificate given by the engineer at the completion of the work. He also thought that the arbitration clauses applied. His judgment would be for the plaintiff upon the question whether or not a certificate had been given, and whether or not the parties had a right to ask the company to refer the matter to the arbitrators to see what further amount was owing to the plaintiff. Judgment for the plaintiff for £2,100, with costs, was then given.

**EMPLOYERS' LIABILITY ACT.**—**CLAXTON V. MOWLEM AND CO.**—(Court of Appeal, August 7. Before the Master of the Rolls and Lords Justices Lindley and Bowen.)—In this appeal case the plaintiff was in the employ of the defendants, the contractors for the sewage works at Barking. The plaintiff was engaged with other workmen in a barge unloading ballast. The ballast was put into buckets, and the handle of each bucket was put on to a hook attached to the chain of a steam crane, and then raised on to the bank, at the same time an empty bucket being lowered into the barge. A banksman stood on the bank and gave the signal to the driver of the crane to raise or lower the bucket. The hook to which the buckets were attached was an open hook, without a catch. On the occasion in question the men in the barge attached the bucket to the chain, the banksman called to the driver of the crane, "Lower away," and the driver lowered quickly, so that the bucket coming up struck the bucket going down, thereby loosing it from the hook, and it fell on to the plaintiff. The plaintiff contended that there was a "defect in the condition of the plant," as the hook had no catch to prevent the bucket from falling off, and also that the accident was caused by the negligence of the banksman, who had "superintendence intrusted to him." He also relied upon Sec. 1, Sub-sec. 4, of the Employers' Liability Act, 1880. The jury in the County Court found for the plaintiff for £200. The Divisional Court held that there was no evidence to go to the jury, and entered judgment for the defendants. The plaintiff appealed. The Court dismissed the appeal. The Master of the Rolls said that there was no evidence to go to the jury. As to the alleged "defect," the evidence given for the plaintiff showed that this sort of hook was always used by contractors in work of this kind, and no evidence was given of any accident having ever happened. It was impossible under these circumstances for the jury to find that there was a defect within Sec. 1, Sub-sec. 1, of the Employers' Liability Act. As to Sec. 1, Sub-sec. 2, the banksman had no "superintendence" over anyone; he was an ordinary workman engaged in manual labour. The foreman was the superintendent, and there was no evidence of negligence in him. Then Sub-sec. 4 was relied upon. The banksman, however, gave no instructions to anyone; he merely gave notice.

But, assuming that he did give orders, a person who was told to do a particular thing was not "delegated with the authority of the employer." If there was any negligence here, it was in the banksman, and he was nothing more than a fellow-servant. The Lords Justices concurred.

## Trade News.

## WAGES MOVEMENTS.

**DUNDEE.**—A largely-attended meeting of Dundee joiners was held on Friday to consider the replies that had been received from the employers with reference to circulars sent them a week previously asking for an increase of wages, and demanding that the standard rate in town should be 7d. per hour. The majority of the masters intimated that they would give the increase asked, but others gave no answer. It was resolved that work should be stopped after Saturday in those shops where the increase was refused.

## CHIPS.

The congress of the British Archaeological Association will be held at Glasgow the week after next, commencing on Monday, the 27th inst.

A new vicarage house for the Rev. T. D. T. Speck has just been erected at Langtoft, East Yorks, from designs by Messrs. Demaine and Brierley, of York. The contractors were Messrs. George Shepherdson and Son, of Driffield.

The Metropolitan Board of Works have resolved to apply to Parliament in the Session of 1889 for powers to undertake as a metropolitan improvement the widening of High-street, Vauxhall, Nine Elms-lane, Battersea-park-road, and York-road, at an estimated net cost of £207,400, and also the widening of Jamaica-road, Bermondsey, at a net cost of £51,500.

Operations are now being carried out in Church-street, Liverpool, for the erection of premises which will complete the "Bon Marche" establishment. On the 2nd ult., the demolition of Glasgow House was commenced; the old building was entirely removed in 23 days, and it is expected the "Bon Marche" pile will be completed in about 17 weeks. The site was handed over to the contractors (Messrs. W. Tomkinson and Sons) on the 26th ult., and building operations were actually commenced on Thursday. The new premises are being built entirely of stone and granite, and the whole of the floors are to be fireproof, and the shop-front will be of plate-glass 130ft. long and 15ft. 6in. high, in a continuous line, unbroken by the usual columns or piers. The architect is Mr. Walter W. Thomas, M.S.A., 25, Lord-street, Liverpool, who also rebuilt Lewis's, in Ranelagh-street, in the same city, after their great fire, within seven months, a building which was illustrated in our issue of the 6th January last.

The Archbishop of York on Tuesday consecrated the new church of St. Hilda, Whitby, which has been erected at a cost of £12,394, from plans by Mr. Robert J. Johnson, of Newcastle-on-Tyne. We illustrated the building by elevation and plan in the BUILDING NEWS for October 23, 1885. Messrs. Padbury and Son, of Scarborough, were the builders.

Various works of internal improvement have just been completed at St. George's Hall, Belfast, including the enlargement of the stage and of the galleries, and the raising of the pitch of the seating of the latter. The work has been carried out from the designs and under the directions of Mr. F. W. Lockwood, Eagle-chambers, Belfast, the contract having been taken by Mr. Isaac Hewitt, of the same town.

The Wiltshire Archaeological Society held its annual meeting last week, Calne being selected as the headquarters. On the closing day, Friday, Broomham and Mellisham churches, Lacock Abbey, and Bowood House were visited.

The foundation-stone of new classrooms, now being added to the Congregational Church at Crewe, were laid last week. The contract for building has been taken by Messrs. Wood and Son, of Willaston, at £520.

Sir Charles T. Newton has resigned the Yates Professorship of Archaeology at University College, London. The appointment, for which application should be made before November 1st, may be made for five years. The endowment amounts to £450 per annum, in addition to a share of fees; but the professor may be required to provide stipends for assistant lecturers.

A new workhouse has been erected at Milton, Sittingbourne, and special attention has been paid to the ventilation, which is carried out on the Boyle system, the latest improved form of the self-acting air-pump ventilator being employed for the extraction of the vitiated air, the fresh-air supply being admitted by Boyle's improved air-inlets.

## Our Office Table.

CARDIFF has been selected as the centre for the provincial meeting of the members of the Society of Architects, which will be held during the week commencing Sept. 24th. Visits will probably be made, among other places, to Cardiff Castle, Llandaff Cathedral, the Docks and Steel Works, Threpstone Castle, Tintern Abbey, and Raglan Castle; and at the ensuing meetings discussions will take place on such subjects as "How can the Society be Benefited by its Country Members?" "The Architects' Registration Bill," &c. Members intending to take part in the meetings are requested to address either the local hon. secretary, Mr. F. Baldwin, 17, Church-street, Cardiff, or the president, Mr. W. H. Seth-Smith, at St. James Hall, Piccadilly, before the 30th inst.

At the closing session of the meeting of the British Medical Association, held in Glasgow last week, several papers were read dealing with various aspects of the problem of sewage disposal. Dr. Littlejohn, medical officer of health for Edinburgh, who presided, remarked that, notwithstanding the wretched manner in which the sewage at Leith and the southern suburbs was disposed of by being cast into the Forth, and the extremely offensive vapour evolved from sewage when brought into contact with salt water, they had never been able to prove increased mortality resultant therefrom. Dr. Russell, medical officer of health for Glasgow, deplored the mode in which the pollution of that city and its suburbs was transferred to the Clyde. Dr. Alfred Carpenter of Croydon, recommended sewage farming on the broad irrigation system, as applicable to a water-closet towns without exception, and Dr. Drysdale, of London, advocated similar view, quoting the results of agricultural utilisation in Berlin, Paris, Birmingham, and Nottingham in support of his opinions; and Dr. J. T. Dyke Merthyr Tydvil; Mr. Whitelaw, Kirkintilloch, and Dr. Murray, of Forfar, bore testimony to the success of downward intermittent filtration in the towns for which they are medical officers of health.

MR. WALTER CRANE delivered the last of course of University Extension lectures in the Sheldonian Theatre, Oxford, on Friday evening, the subject being the educational value of art. He said that one of the means of making education interesting was too much neglected, namely, that enough account was not taken of the eye, its sensitiveness to impression, especially impressions of beauty. This was not recognised, as a rule, in schools, and the consequence was the too frequent insensibility to harmony and proportion in visible things which was sometimes met with even along with a high degree of culture. We were hearing much of technical education, but if that merely meant a specialising of putters-on of pin heads or a training for a machine-minder, it did not feel much enthusiasm for it. What they thought how closely interwoven with the warps of history and humanity were the golden threads of art it hardly seemed necessary to gauge the educational value of art, for itself was an education.

**Architectural Association.**—Visit to St. Dunstan's College, Catford Bridge, Aug. 25th. Postal order for 1s. 6d. to Mr. Ernest S. Gale. Meet Cannon-street 2 p.m. Members desiring any alteration of the addresses in the Brown Book are requested to send notice of same to Mr. Hampden W. Pratt, 6, Duke-street, Adelphi, before the end of August.

**Holloway's Ointment.**—This cooling Ointment, perseveringly rubbed upon the skin, is the most reliable remedy for overcoming all diseases of the throat and chest. Quins, relaxed tonsils, sore throat, swollen glands, ordinary catarrhs, bronchitis, may be arrested as soon as discovered, and every symptom banished by this simple and effective treatment.

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# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

VOL. LV.—No. 1755.

FRIDAY, AUGUST 24, 1888.

### THE ARCHITECT AND ART CRAFTSMAN.

A REMARKABLE difference may be seen in the work of architects, not only in the manner they begin to incorporate their ideas, but in the methods they use to carry out their intentions. We have heard builders declare that they would twice as soon work under one architect than under another. Mr. Five-per-Cent. has the reputation of seeing to everything himself; his drawings are minute and descriptive, he furnishes details for everything, he will have samples and specimens of manufacture brought to his office, his superintendence is thorough and unremitting. Mr. Five-per-Cent. leaves everything to the clerk of works or foreman of the builder, after the drawings are prepared, which are done in a mechanical sort of fashion, and the contract is entered into; the rest of the work is looked upon as a sort of operation akin to machine brick-making. With the first of these the architect's work is not finished till the whole building has been turned out of the contractor's hands, and the exercise of skill and artistic thought is just as much necessary in drawing the profile of an architrave moulding as it is in designing the plan. According to the second, the architect's labour is complete when the contract has been signed. We wonder when we look down the lists of readers which are weekly published, to find the diversity that exists, why some have charged thirty or even fifty per cent. more than another for the same work, tendered on the same bill of quantities, and on the same drawings; but this disagreement in estimating will not be surprising to any one who knows the different requirements of architects, and how only one or two out of a dozen who tender know by experience the real meaning and intention of the architect. Smith and Brown are two competitors: the first has had transactions with an architect on previous occasions, and has learned from experience what such entries as "timber to be of the best Dantzic, Riga, Memel," "no American or Swedish fir to be used," and "everything to be of the best quality and approved by the architect," really mean; while the other has interpreted them in a more honest and literal manner. The experimental or "try-it-on" tactics of Smith have been of service to him; he knows that a specification and bill are simply documents—nominal instruments required in making a contract—and attaches no weight to them. Other builders soon come to know the architect's tastes and predilections, and they make a considerable discount when they see a Swedish or some other inferior deal can be substituted and details departed from. There are obviously two ways in which architects set about their work. Mr. Five-per-Cent., under which appellation we may describe the ordinary practitioner, deals with building in a very business-like way. He prepares regulation plans without taking the trouble to inquire if some newer and better arrangement can be adopted; he leaves the specification and all his details to the surveyor, who prepares the quantities, or to the builder who undertakes the contract: these things much beneath his notice. Mr. "In-the-Work" proceeds very differently. He does not draw a line of the plan till he has made himself acquainted with the best buildings of the same kind; he is not content with published precedents, but personally examines buildings, and, acting on his judgment, produces the most perfect

design of which he is capable. This he elaborates; instead of leaving them to chance and the surveyor, the details are carefully studied; upon each of them he devotes personal attention; he makes inquiries, examines materials and manufactured goods. Not content with these preparatory labours, while the building is in progress his mind is still directed to the task of improving; he inspects every piece of work before it is fixed, and every moulding passes his scrutiny. Stock-in-hand patterns and ready-made goods do not suit him; everything, down to the grates and fenders, must be made to order from special designs. The effect on the building trades of each of these modes of dealing with work is evident. Mr. Five-per-Cent. does not care one iota for the British art workman so long as the labour is performed with ordinary skill, as he does not trouble about little things; the artificer has only to turn out as much work as he can, and to avoid glaring mistakes. Under the second regime there is competition in skill—the workman is selected for his competency in his trade and his artistic capabilities. We see the bricklayer and mason striving to do his best in brick-setting and gauged work, the joiner careful of his mitres and finish of his framing, the plasterer, the smith, the plumber, and painter each in his way anxious to exhibit good workmanship. The really competent craftsman is the loser under the first system; he feels that all his training and ability are thrown away in competing for buildings in which the chief idea is a low contract performed against time; he has no chance in the market with apprentice hands and slop-workers. The connection between architect and workman is completely severed; the architect himself need not be an artist. Let us trace the results in the trades of the mason, joiner, and decorative artist.

In the mason's trade the results have been disastrous. Some years ago we remember German masons were sent over to do the work which English masons would not do under the trade-union rules. The fixing of masonry by piecework enabled the skilled hands to earn £3 or £4 per week, but the Union interfered, and prohibited some men from earning what they could by their skill. As skilful masons are less in requisition, so the trade becomes recruited by the entrance of a number of hands who are indifferent masons. Trade-unionism has simply protected mediocrity and limited the hours of work. Masonry is now very much curtailed in consequence. Solidity is very rarely met with, all because good work has not been encouraged by architects, and a number of mechanical and ill-trained masons have glutted the market, whose motto seems to be "to do as little as they can for a day's wage." The quality of the work turned out tells its own tale. Cornices are now built up with the least quantity of stone, the labour on plinths and sills is reduced, scantlings are cut down to the finest, and joints and beds are often scamped.

Quite as much difference is shown in joiners' work. We all know what a large proportion of prepared joinery comes from America, Sweden, and other parts. The English joiner has now to compete with machine-made work. So long as people admire mechanical accuracy, smoothness, and rapidity of execution, machine joinery will be in quest. But the architect has it within his power to encourage the production of a class of work in which other and superior qualities are shown, in which the skill and artistic ability of the worker are called out. The superficial observer sees little difference between them. Mr. Five-per-Cent. is well satisfied with machine-made doors and framing. But the character of the old work was in its being hand-wrought. Take the Mediæval joinery: the quaint stop moulding in the stile is one of the features that give the

framing its interest; later on, the stop was worked on the rail. The mitre joint is pre-eminently a modern contrivance. The old framing, with its narrow panels, was full of mortising and tenoning; screws and nails were not used—only the wooden trenail, and much labour was expended on this kind of joinery. Then we have the mouldings struck in the solid, not applied, and the old "planted" work which was superseded by panel work; the grain of the wood was observed in all the mouldings, which ran with it, never across it. We do not say, Go back to these methods of framing; but let us by all means get the joiner to exercise his own ability—to think for himself, and not to trust implicitly to guides and other machine appliances. The large importation and use of ready-manufactured joinery must be attributed to the architects of the Five-per-Cent. school, who are intent upon shortening their labour in design. Hence we have the outpour of catalogues of doors, dadoes, sashes, and shutters, pulpits, pews, benches, lecterns, and other joinery. Some of these designs are creditable, and in merit surpass the ordinary architect's work; but they are made without a distinct purpose in view. We cannot but feel they lack congruity and fitness for their position. Each artist has designed his work in his own shop. Instead of being made for the building, the furniture looks out of harmony with it. We have seen bare churches fitted with desks, benches, and pulpits that have been chosen from a manufacturer's stock—everything looks out of joint. Even glass painting is done in the same fashion: every window has its own glass painter, several decorative firms have been turned loose into the edifice, and have revelled in ideas and colours of their own. How different to the mode of doing things in the old Mediæval times, when the artists were associated together, and a common sympathy for art prevailed! The root of the error is in separating architecture from the sister arts. We now look upon a building as quite distinct from its fittings and its decoration. Unlike the Parthenon, which was adorned by painting and sculpture, or the Mediæval edifice in which these arts were fully enshrined, it is regarded as being complete. The old architect carved and painted his edifice; his windows were filled with painted glass, his capitals were carved into beautiful foliage, and saints and historic legend tenanted the niches and spandrels of the arches. The early painters found their chief occupation in painting triptychs, tabernacles, and roofs. The ordinary fittings of houses and churches were painted and carved. Not only the Mediæval artists, but the Italian artists of the 13th, 14th, and 15th centuries, exercised their artistic functions in the painting and sculpture of buildings; and they would no more have thought of expending their abilities on structures built by contract, designed without any reference to their adornment by sculpture, or fresco or glass, than they would have tolerated contracts for these objects by separate artists in the manner so common in our own day.

### LAND SURVEYING.—V.

TAKING ANGLES.—SURVEYS WITH THE THEODOLITE.

IN chain surveying it is necessary to divide the district or field into triangles, and to run two or more base lines upon which to construct a system of triangles or intersecting lines near the centre of the survey; but with the use of angular instruments this method is not necessary: the land may be divided into quadrilateral figures or trapeziums with the boundary lines. We shall now show how a plot of the shape given in plan 8 can be surveyed by the chain and theodolite, or any angular instrument. The plan we give has the chain lines numbered in the







sides of a triangle are to each other as the sines of their opposite angles, so that any side is to the sine of its opposite angle, as any other side is to the sine of its opposite angle. To find the sine of an angle, begin the proportion with the side opposite to the given angle, and having the sine, the corresponding angle can be found in any trigonometrical table. To find a side, begin the proportion with the sine of the angle opposite the given side. Let us take an example under case 2, where two of the angles are known, and the side opposite to one of them. The given side of the triangle let us call  $a$ , opposite  $A$  the given angle,  $B$  the other angle. Then,  $\sin A : a :: \sin B : b$  the side required, or  $\frac{a \times \sin B}{\sin A} = b$ .

By assuming any length in chains or feet, the given side  $a$ , and measuring the angles  $A$  and  $B$ , the required side can be obtained, the calculation being facilitated by a table of natural sines.

The intersection of lines plays a very important part in surveying by the theodolite, or any angular instrument, as having two sides and one included angle, or two angles and one side, it is possible to find the distance between two inaccessible objects as two buildings, or to lay down a triangle from a given base line, and a remote object, illustrations of which will occur to any intelligent reader. Geometrically, one base line and two angles at its extremities enable the triangle to be completed by the intersection of the two sides drawn through the angles and their lengths taken, a problem which can be accomplished with exactness by a simple equation. As given, one side  $a$  and two angles  $B$  and  $C$ . Then side  $b = \frac{a \sin B}{\sin A}$ .

And side  $c = \frac{a \sin C}{\sin A}$ . The angle  $A$  being determined by deducting from  $180^\circ$  the given two angles. The labour involved in the multiplication and division of numerical quantities of several figures is very tedious, and the method of working by logarithms, or the representing of numbers by indices, is largely employed in the solution of triangles, as these two operations of arithmetic are performed by simple addition and subtraction. It is not within the scope of these articles to enter into the subject of logarithms, which the student will do well to study for himself.

#### ARCHITECTURAL ASSOCIATION EXCURSION, 1888.—III.

[WITH PHOTOGRAPHIC ILLUSTRATIONS.]

OUR descriptive notes concerning these proceedings terminated last week (p. 203) at Chesterfield, where, owing to pressure of time, the excursionists could not inspect the interior of All Saints' Church, already alluded to. It is a complete cruciform building chiefly of Decorated architecture, with Early English work in the transepts and Perpendicular windows in one or two positions. The Renaissance tombs to the Foljambes are exceptionally good, and the reredos of wood once really formed part of a parclose or screen round the Foljambé chantry. The programme on Wednesday opened with a long carriage journey to Tissington, passing Cromford at starting, and traversing the Via Gellia, with its well-wooded slopes and curling streams, which course their ways among the meadow-sweet beds on each side of the road below. A contrast to this delightful valley is found in the wild, bleak table lands which are known as the "Hill Top," between Egnaston and Ballidon. Making a descent towards the entrance of romantic Dovedale, and leaving the Peveril of the Peak hostelry to the left, Tissington was soon reached, and the church (St. Mary's) was quickly seen, for but little remains to interest the architect, as it was restored out of knowledge in 1854. The principal entrance has a good example of a Norman doorway, and the crudely-carved font is highly curious and barbaric in design. There

is a rich brass and an elaborate lofty monument, with some other memorials, to the Fitzherberts, who flourished in the 16th and 17th centuries here, and, if we may credit their inscriptions, history has thanklessly not done justice to their great qualities. The Hall at Tissington is the seat of Sir William Fitzherbert, but the excursionists were not allowed inside the gates, and so saw the building from the road. It is a small and not very remarkable sample of Elizabethan design, with a projecting window or two suggestive of Haddon Hall on a small scale, but with very ugly chimneys rising from the parapets, and an ordinary sort of doorway and porch. There are several springs in the village, and on Holy Thursday these wells are decorated with flowers, the villagers going in procession to church, singing psalms and chanting hymns, when a suitable service is held. In other parts this custom has degenerated into vulgar editions of the wakes. At Ashbourne bills were posted announcing the wake festivities, to be enlivened by mummies in character, and wake sermons in conjunction with these proceedings were advertised in the shop windows on the occasion of our visit. Mr. James Fowler, F.R.I.B.A., of Louth, described the church at Ashbourne, giving a brief epitome of its history, with particulars of its monuments, acknowledging his indebtedness to Mr. Maurice Adams for several details concerning them. We illustrated the church, showing its grand spire, known as the "Pride of the Peak," in our issue for August 10 last, when we printed some notes recounting the leading facts which mark its history and elucidate its characteristics architecturally considered. While we regret that much of the restoration here, executed under the supervision of Sir G. G. Scott, R.A., partook of too thorough a manner, it is but fair to add that a good deal of the destructive work was done by L. N. Cottingham many years ago. The Free Grammar School, built in Elizabeth's reign by Sir Thomas Cockayne, is situated near the church in the main street, facing a row of stone-built almshouses of the same date and of similar interest. Both buildings are simple specimens of their kind, and require but little description. The excursionists had lunch at the comfortable old hostelry celebrated as the "Green Man," and next proceeded to Bradbourne, where the church and beautifully-furnished Manor House were inspected under the direction of Mr. A. Hartshorne, who lives there. The Manor House itself is a simple building devoid of any special features save a very good staircase, but the elegant old cabinets, pictures, and works of art which it contains, coupled with the good taste displayed in the general arrangements and decorations, make the place most interesting. It is well situated to the east of Bradbourne Church, and has a good garden. The church is small, and has a low, square Norman tower of early date, with a rich door of that period inserted on the south side, with the usual Norman carvings and enrichments. Almost every style is represented in the building, from Norman down to the hideous marble, tile, and stone reredos of Victorian date, which disfigures the chancel. At the east end of the south aisle is a refined specimen of Adam's work in the form of a mural marble monumental slab, simply treated with elegant detail. Mr. Hartshorne exhibited a large coloured plan of the church, marking the various dates of its erection. The proceedings here terminated with an hospitable reception in the grounds of the manor. No time remained to see Brassington, and a two-hours' journey brought the party back to Matlock Bath for a late dinner.

Thursday was the most enjoyable day, in spite of the weather, which was cold and overclouded, like the rest of the week; but the adverse climatic circumstances were compensated very considerably by the interest of the places visited. An early morning drive through Rowsley (where, of course, everybody saw the "Peacock Tavern"), speedily brought the Associationists to Haddon Hall, when the President, Mr. H. D. Appleton, delivered a short address descriptive of the mansion and its builders. It stands, as the photograph printed herewith will show, on a well-wooded acclivity, overlooking the banks of the Wye, which picturesquely divides the meadows beneath its verdant pastures, where fat bees feed and give colour to the landscape. We printed some particulars of

the hall, with photographs of the interior, last week, and we also gave a detailed drawing of the ball-room. Besides the general view of the entrance tower, reproduced to-day from Messrs. Poulton's charming picture, we add an interior of the banqueting hall, and, according to promise, may now recapitulate the leading facts of its history. At the time of the Domesday Survey the Crown owned the manor, but William Peverel shortly afterwards possessed it, and on the death of William de Avenell, about the middle of the 12th century, it passed to the Vernons, and, as we mentioned last week, then went to the Manners family, the present owner being the Duke of Rutland. It has not been inhabited since 1703, and most of the rooms have been denuded of their furniture; but in many of them the ancient tapestry remains, while in one or two there is shown some curious bedsteads, a cradle, and other historic examples of wood work. The house is well cared for, and is in admirable repair structurally. Every facility is afforded to the public to view the place, and many thousands avail themselves during the season of the opportunity of seeing the buildings. The lower part of the walls on the south front and of the north-east tower are of the Norman period, and there are also some remains of that date in the chapel. The hall-porch, the kitchen, and adjacent offices were built in the 14th century, and so were the banqueting-hall, which divides the two quadrangles, the north-east tower, the cellage under the long gallery, and parts of the chapel. This building was finished in the 15th century, when the wing forming the east side of the upper quadrangle was erected. The western range of buildings in the lower court and the west end of the north side date from the earlier part of the 16th century. The long gallery, terraces, gardens, and various interior fittings and alterations belong to a hundred years later. It is not generally known, but, as Mr. Wm. M. Fawcett pointed out, there is a most remarkable parallel in plan and arrangement between Queen's College, Cambridge, and Haddon Hall, the only real difference being in the position of the gate-house. Several hours were spent by the party in examining the building, and many sketches were made, in spite of the wintery weather. Lunch was taken in the hall, where there remains some antique furniture; and before leaving, Mr. John L. Robinson, A.R.H.A., the hon. photographer to the A.A., took a group of the excursionists. Bakewell Church was next seen, and without doubt it is an exceedingly interesting cruciform building, although the north transept, with the central tower and spire, were rebuilt in 1841 at the time of the restoration of the fabric. The west end is Norman, and the rest is of various dates, chiefly Early Decorated. The Norman church had an apsidal end; but the present chancel is double the original length, and has a square end, with two windows, divided by a central pier and external buttress. The effect of this inside is very good, and the difficulty of successfully treating the high altar in relation to the dual fenestration has been admirably achieved by Mr. Geo. Gilbert Scott, M.A., who furnished the choir with stalls, erected a handsome screen, and decorated the chancel a few years ago. The reredos is a lofty and richly-designed structure in wood, running up between the windows, with florid pinnacle work, so contrived as to compose harmoniously with the lines of the openings beyond the altar, standing some few feet from the east wall. In the centre is a boxwood sculpture representing the Crucifixion. The pavement of the choir is in glass mosaic, of thoroughly good design, and the mural decorations, like those on the roof, are in reds and greens on a cream ground. The sculptures to the oak screen are in pear-wood; but the stalls are of oak entirely, some remains of the old ones being re-used where possible. The porch contains a very remarkable collection of Celtic and Irish-like crosses found in the neighbourhood, and some of these are extremely beautiful examples, and the south transept contains many monuments of considerable importance of the Vernons. No church seen during the week afforded more pleasure to the party than Youghreave, with which Thursday's programme finished. The church (All Saints) was essentially a good one, with a noble western tower; but Mr. Norman Shaw, R.A., has in-



vested the interior with the greatest interest without altering it in any leading particular structurally, and without asserting himself or his fancies. In fact, the only things in the building which seem out of place are the French chancel-light standards and the Birmingham brass altar-rail uprights, and for these Mr. Shaw is not responsible. The new fittings include the choir-stalls, altar, credence, and richly-treated pulpit, all of oak, like the seats in the nave. The floor of the church rises considerably towards the west end, and to avoid the effect of going down into the chancel, Mr. Shaw made the floor dip in the centre, and so a rise is secured towards the east, instead of a straight fall from the west end direct to the chancel. This is a small detail, but its effect is all that its author could wish. Instead of filling up all the available space with benches, a wide aisle is left, and an extensive space is arranged, too, round the font at the entrance, thus making the building look larger than it really is, with a result in other ways which cannot be over-estimated. The windows have their old quarry glass reinserted, after being repaired, and some quarries are of one shape, and some another, looking as if the lights belonged to the building. We need hardly say how much better this is than the usual regulation arrangement of what is called "cathedral glass," patterned out in all the shades of a glazier's trade list. The east window is a grand piece of work, from the designs of Mr. Burne Jones, A.R.A., representing Our Saviour and the Four Evangelists, in harmonious colourings by Messrs. Morris, and comprising some fine drawings of the figure. This window was the last specimen erected in an old building by this firm before they determined to put no more of their glass in ancient churches. Other splendid windows have been executed for Youlgreave Church by Mr. Kemp, and we think his glass is even more successful as glass than that by Messrs. Morris, which looks here too opaque—except, perhaps, the central figure, which is brilliant and jewel-like in character. The font is a remarkable example in hard grit stone, having a holy water stoup attached to the bowl, supported by a grotesque beast. The late Mr. Bloxham, when he was there, said this was one of the only three examples of the kind remaining in England. It formerly belonged to Elton Church. The parish registers of this church are very early, and are in fine preservation. The bells, too, are good. Anyone visiting this neighbourhood should not fail to see Youlgreave, and learn how a church ought to be restored, and remember it was done in 1869-70—long before the "Anti-Scrape" Society began to fuss and fiddle.

Friday's business began with a railway journey via Derby to Nottingham, where the travellers were met by drags to convey them to Wollaton Hall, some two miles out of the town, Lord Middleton's country seat. The entrance gateway was built from the plans of Robert Smithson, whose plans for this structure and certain minor alterations to the hall are preserved in the building, with some designs by Wyatt and by Messrs. Buckler, well known in their day as successful architects. Mr. Arthur Marshall, A.R.I.B.A., of Nottingham, met the excursionists, and Mr. J. A. Gotch gave a few particulars about the buildings. Wollaton Hall was designed by John Thorpe, whose plan for the house exists in Sir John Soane's Museum, and was built by Sir Francis Willoughby about 1580-88. Its erection occupied eight years, the Smithsons, father and son, being employed at first as clerks of the works to superintend its completion. There is undoubtedly an air of dignity and grandeur about the house, with its four great towers at the angles and the crowning feature of the building, which boldly rises in the centre of the composition, which is emphasised by the circular stone turrets at the four corners. Each front is similar to the other in general design, and our illustration of the garden side last week shows the most taking elevation. Inside the house is not very interesting, though it contains some fine pictures and works of art. John Thorpe's autograph sketch for the exterior façades was reproduced in fac-simile by Mr. Maurice B. Adams in the BUILDING NEWS for January 25th, 1878, when other similar examples of this architect's drawings were given. Over the entrance is the inscription "En has Francisc Willoughbæi ædis rara arte

extractas Willoughbæis relictas.—Inchoatæ 1580-88." John Thorpe probably died during the progress of the works, and a short epitaph in the neighbouring church records him as plain "John Thorpe, Surveyor and Builder." In the Wollaton church, however, is another monument, which illustrates the characteristic *esprit de corps* of the architect who finished Thorpe's work:—"Here lieth ye body of Mr. Robert Smithson, Gent., architector and surveyor unto the most worthy House of Wollaton, with diverse others of great account. He lived in the faith of Christ 79 years, and then departed this life ye XVth of October, AN'o D'NI., 1614." The great hall, with its hammer beam roof and flat ceiling, is the most interesting part of the interior. It measures 62ft. long by 30ft. wide, and it is 56ft. high. There were three grand staircases and a saloon, the latter being reached immediately from the garden entrance. On either side were placed the stairs, and these, with the saloon, occupied one side of the central hall. The three sides are employed to enrich the several stages of the angle towers, the Doric and the Ionic only being used for the main building. The ground floor is 15ft. high, and the first floor measures 17ft. The towers are crowned with perforated and shaped pediments, with a sort of flying buttress-like terminal, formed by four chimney-shafts, rising in the centre. An open balustrade extends round the intermediate façades. A large room exists over the hall and was intended for a ballroom, but is used as a store. The decorations on the staircases were painted by La Guerre, a pupil of Verrio, about 1680, and were restored by the elder Reingale. The subject of the ceiling represents Prometheus in the act of stealing fire from heaven, and the amazement of the gods of Olympus at his audacity. Portraits of the Willoughby family are introduced into some of these subjects. The staircases themselves are not the original ones. Ancaster stone was used for the building, and it is a great witness to the value of that material to feel how sharp the masonry has stood for three hundred years. The central part seems to have been added subsequently, and some have given Jeffery Wyatt credit for its erection; but on reference to John Thorpe's own drawing for the mansion this part is shown as executed with one or two minor modifications. The buttresses at the angles, for example, are alterations on the first design. An oil painting of the house seen in the hall, by F. Sibrechts, and dated 1695, exhibits the building as we now see it. John of Padua is generally mentioned as the architect of the house; but this claim will not pass examination, though no doubt Italians were employed on the sculpture introduced so freely into the elevations. During the past fortnight Lady Middleton has discovered the building accounts connected with the house, and Robert Smithson is named as clerk of the works; and he was employed at Longleat also. The masons were paid 10d. per day. Wollaton Church, just outside the park, is a very interesting building, having a western tower, with open arches on the N. and S. sides to the church, and thus forming a sort of western porch to the nave. The building contains some exceptionally good tombs, that on the north side of the chancel being the best of the series. Mr. Hodgson Fowler, of Durham, recently restored the fabric, and right well has he executed the work. The altar-piece is a late work in the Renaissance style, nicely coloured by Mr. Kemp, who decorated the east end and executed the glass in the windows. The new woodwork of the church is only fairly good. One feature in the recent fittings worthy of remark is the introduction of running curtains to the south windows to exclude the sun and furnish the church. This might often be done with great advantage in other churches; but usually the clergy object to this obvious improvement. Nottingham Castle was next visited, and the fine collection of pictures and works of art were examined, as well as the remains of the ancient fortress on the rock. St. Mary's Church greatly pleased the visitors for its vastness, lightness, and elegant design. Mr. Bodley, A.R.A., has lately added an altar-piece and other fittings in the chancel. St. Barnabas R.C. Cathedral, by the great Pugin, was inspected, and admired for its breadth of composition and boldness of design externally. The Albert

Hall, adjoining this church, is a strange contrast to Pugin's work, and may be described as vulgar in the extreme. The final dinner of the excursion was held on Friday night at the Bath Terrace Hotel, the comfortable quarters at Matlock of the excursion party. On Saturday some of the members visited Derby and went to the parish church, there to see Dorothy Vernon's tomb and the Cavendish monuments, for which the church is justly celebrated. Some of them are very poor pieces of work. The wrought-iron work to the sanctuary is very complete and good.

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—VII.

By HENRY LOVEGROVE, F.S.I., Surveyor.

JOINER AND IRONMONGER.

63. **FLOORS.**—The whole of the boarded floors throughout, except ground floor and attics, to be lin. wrought yellow batten, straight-joint flooring, with splayed headings, and mitred borders to hearths. The floors on ground floor to be similar; but 1½ in., and in box rooms ¾ in., sawn deal floors.
64. **Materials.**—The very best stuff to be used for these floors, and if any joints open more than one-sixteenth part of an inch within six months after the completion of the works, the whole must be taken up and relaid.
65. **Skirtings.**—The three reception rooms and the bedrooms on first floor to have 2 in. twice-moulded skirting, 1½ in. high. The box rooms to have ¾ in. skirting, 6 in. high. The basement to have lin. square skirting, 6 in. high, except the breakfast room, which, with the w.c., &c., on ground floor, is to have lin. moulded skirting, 9 in. high. The scullery, larders, &c., to have cement skirting as described.
66. **Windows.**—The windows of attics to have 6 by 3 oak wrought framed, sunk, weathered, and throated sill 4½ by 3, fir wrought framed, rebated, and beaded frame, 2 in. moulded sash, about two-thirds hung with 2½ in. butts, and fitted with Japanned iron casement lever fastening and stay. One inch window-board, with rounded edge and moulding under, ¾ in. wrought framed and splayed narrow grounds. The windows of bath-room and staircase, the three-light window first-floor, windows in entrance, circular windows, small windows near fireplace, window next garden entrance and to cooler to be similar to last. The windows generally to have deal-cased frames, with wide oak sunk, weathered, and throated sills, brass axle pulleys, patent flax lines and iron weights, 2 in. moulded sashes, double hung—the sash bars to be extra wide, in small squares, the top sashes to have moulded horns. The sashes to be fitted with brass spring sash fasteners, the lower sashes, when large, with brass sash lifts, and the upper sashes with pull-down handles. All to have window-boards or nosings, as required, 1 in. linings, ¾ grounds, and architraves to match the doors in each room.
67. **Doors.**—The attic doors to be 1½ deal four-panel moulded both sides, hung with 4 in. butts, and fitted with 6 in. iron rim locks, brass furniture and patent spindles, and china finger-plates on both sides, 1½ rebated jamb linings, ¾ narrow framed and splayed grounds, 3 in. moulded architrave with splayed plinth blocks 7 in. high to match skirting. The box-room doors to be 1½ two-panel moulded, and square, hung with 3 in. butts, and fitted with 6 in. iron rim locks, 1½ in. jamb linings, and 1½ in. by 1 in. chamfered fillet as architrave. The doors on first floor to be 2 in. deal, three-panel moulded both sides, hung with 4 in. butts and fitted with 6 in. mortise lock, and best china furniture with patent spindles, finger-plates on both sides to match furniture, 1½ double rebated jamb linings, ¾ in. framed, splayed, and beaded grounds, 4 in. moulded architraves, and 12 in.



splayed plinth blocks to stop skirting. The w.c. door to be similar, but to have the upper panel glazed (with matted sheet) in beads, and to have a brass w.c. latch and private bolt. The four doors to reception rooms to be 2in. deal six-panel, moulded both sides, hung with 4in. butts, and fitted with 6in. mortise locks, and white and gold furniture and finger-plates, 1½in. double rebated jamb linings, ¾in. framed, splayed, and beaded grounds, 4in. architrave mouldings and plinth blocks as before. The doors to w.c. and cloaks to be 2in. four-panel, moulded both sides, all as last, but fitted with brass w.c. latch and brass-necked bolt. The doors to breakfast-room and kitchen to be 2in. four-panel, moulded both sides, to larder and pantry moulded and square; the other basement doors, except those hereafter described, to be 1½in. four-panel square. All the other doors to be hung with 4in. butts in 1½in. double rebated jamb linings, with grounds as before, 3in. architrave and plinth blocks. The door from dining-room to conservatory to be 2in., the lower panel moulded both sides, the upper part sashed with extra stout bars in small squares hung with 4in. butts and fitted with 6in. mortise lock, two 9in. brass barrel bolts, and finger-plates as to dining-room door; the framing to match the door. The above door to be hung in 6in. by 4½in. rebated and beaded frame, and 6in. by 3½in. mullion and transom grounds and architraves to match other doors adjoining. The front entrance door to be 2½in. deal, the lower part in two panels moulded both sides, the centre part sashed in small squares and extra stout bars, the top part in semicircular panel moulded both sides and filled in with ornamental radiating bars hung with one and a-half pairs of 5in. butts; a Chubb's night latch, 20s., p.c.; letter-box handle and plate, p.c., 30s.; the frame to be 5in. by 5in., with 2in. by 2in. moulded fillet planted on, and the mouldings generally as shown on detail drawings. The doors to coals and tradesmen's entrance to be 1½in. deal, proper ledged hung with 15in. cross garnets and fitted with 8in. stock locks, the latter door to have, in addition, two 9in. barrel bolts; the frames 4½in. by 3in., with 3in. architrave. The door to back entrance to be 2in., the lower part in two panels moulded both sides, the upper part sashed as before; 4in. butts, 5in. drawback lock, and two 9in. barrel bolts; 2in. moulded fixed light, 4½in. by 3in. frame grounds, and 4in. architraves. The door near dustbin to be 2in. bead flush and square, the upper part sashed, hung with 4in. butts by 3in. frame, and fitted with stout drawback lock.

68. *W.C.*—The servants' w.c. to be fitted with 1in. clean deal seat and riser on strong fir bearers, the seat hung with 3in. butts, 1½in. framed and beaded frame, and mitred, clamped flap, hung with 3in. butts. The edges of flap and frame to be rounded, and the seat to have 4½in. x ½in. square skirting. The best w.c.'s to be fitted with lin. Honduras mahogany seat, and riser on fir dovetailed bearers, the seat hung with 2½in. brass butts, 1½in. mitred, clamped flap, and framed and beaded frame, hung with 2½in. butts, the flap to have a thumb moulding tongued on, and the seat to be skirting round with ¾in. x 4½in. beaded mahogany skirting.

69. *Bath-Top*.—The bath-top to be lin. Honduras mahogany, French polished, dished, and shaped, one edge rounded; the top on three sides to be skirting round with ¾in. x 4½in. beaded skirting, as before. Enclose the bath with ¾in. deal matched and V-jointed boarding, with small inspection door in same, hung with 2½in. brass butts, and a plinth, 6in. high and 1in. thick, planted on.

70. *Housemaid's Sink*.—The sink to have 1½in. deal top, on 3in. x 2in. bearers, the edge of top rounded, and skirting round with 4½in. deal square skirting. Under the

sink, 1½in. deal wrought, framed, and beaded inclosure to sink, with folding doors, hung with 2½in. butts, and fitted with brass knob turnbuckle, and 4in. iron neck-bolt.

71. *Scullery Sink*.—The sink in scullery to have top and bearers as last, also inclosure doors, &c., as last.

72. *Cupboard in Kitchen*.—Form a cupboard in kitchen 5ft. wide and 9ft. 6in. high, 1½in. deal beaded front, and two doors in same hung with 3in. butts, and fitted with brass screw cupboard knobs and roses; form tiers of shelves on 1½in. by 1in. wrought bearers plugged to wall.

73. *Dresser*.—The kitchen dresser to have 2in. top 2ft. wide on fir-framed, legs and rails 3in. by 3in., with 1in. pot-board with rounded nosing, 1in. riser, ¾in. skirting, 6in. high; three drawers, with ¾in. bottoms, ¾in. sides, and 1in. beaded fronts dovetailed together, and blocked oak runners; brass flush drop handles, and drawer locks. The upper part of dresser to have 1½in. wrought, cut, and shaped standards, three tiers of 1in. shelves, splay rebated for plates, 1in. wrought and beaded fascia, and 4in. moulding as cornice.

74. *Shelves*.—Provide and fix where directed 40ft. run of 1in. shelves 9in. wide; 43ft. of 12in. wide; and 22ft. of 21in. wide; all on proper bearers.

75. *Pipe Casings*.—Provide and fix where necessary deal proper pipe-casing, fixed with brass caps and screws, and deal wrought rebated and beaded grounds plugged to walls.

## JOINER AND IRONMONGER.

## FIR FRAMES, &amp;c.

		£ s. d.
267ft.	Run 4½in. by 3in. framed, rebated, and beaded frame	
8 "	Do. slightly circular to segmental head	
66 "	Do. as first and grooved	
9 "	Do. circular do	
30 "	5in. by 4in. framed, rebated, and moulded frame	
9 "	Do. circular to segmental head measured nett, including joints, keys, and wedges	
19 "	6in. by 4½in. framed, rebated, and beaded frame	
10 "	Do. circular to segmental head as before	
14 "	5 by 5 framed, rebated, and moulded frame	
6 "	Do. circular to segmental head as before	
10 "	4in. x 3in. framed double rebated and double beaded mullion	
4 "	4 x 3 do. do. do. weathered	
52 "	4½ x 3 do. do. do. mullion	
28 "	6 x 3½ do. do. do. do.	

## FLOORS.

Sq. Ft.		
3 20	Supl. ¾in. deal sawn straight joint floor	
30 75	" lin. wrought yellow batten straight joint floor with splayed heading joints and mitred borders, and return do. to slabs (slabs not deducted)	
6 "	Do. and bearers in openings	
12 "	1½in. flooring all as last	
7 "	Do. and bearers do	
4 Run.	Labour notching 1½in. floor	
33 "	Raking, cutting, and waste on lin. floor	
20 "	Do. do. 1½in. do.	
No. 1	Extra labour and material forming sinking in 1½in. floor for door-mat	

## SKIRTINGS, INCLUDING GROUNDS AND BACKINGS.

127ft.	Run ¾in. square, 6in. high, fixed to partitions	
18 "	Do. plugged to walls	
No. 18	tongued and mitred angles to do.	
46 "	1in. square, 6in. high, plugged to walls	
No. 6	angles as last	
4	houings	
114 "	1in. torus moulded 9in. high fixed to partitions	
252 "	Do plugged to walls	
No. 45	angles as before	
8	obtuse do.	
10	Scribings	
26	Housings	
185 "	Skirting to match wall, strings of stairs, and plugging walls	
No. 39	Angles as before	
2	Obtuse do	
43	Housings	
2	Junctions with cement skirting	
30 "	2in. twice moulded skirting 11in. high fixed to partitions	
462 "	Do. plugged to walls	
No. 83	Angles as before	
8	Obtuse do.	
16	Scribings	
26	Housings	

## WINDOWS.

54	Supl. 2in. moulded casements in small squares, with wide bars, fixed	
82 "	Do. hung on butts	
16 "	2in. moulded fixed light, the top rail slightly circular to segmental head	

5	Supl. Do. do. with radiating and concentric bars semicircular measured nett	£ s. d.
5 "	Do. circular do., with circular bar in centre and radiating bars do.	
355 "	Deal cased frames with extra wide oak, sunk, weathered, and throated sills, and 2in. deal moulded sashes, double hung with brass axle pulleys, patent flax lines, and iron weights, with wide sash bars in small squares	
67 "	All as last in two-light frame	
204 "	Do. in three do.	
No. 84	Extra to moulded horns to top sashes	

## DOORS.

42 "	1½in. proper ledged slightly segmental at top	
105 "	1½in. four-panel square	
64 "	1½in. two-panel moulded and square	
54 "	1½in. four-panel moulded both sides	
21 "	2in. bead flush and square door, the lower part in two panels, the upper part sashed with stout bars	
63 "	2in. four-panel moulded and square	
125 "	2in. three-panel moulded both sides	
18 "	2in. do. do. the upper panel open and prepared for glass, and with diminished stiles	
78 "	2in. four-panel moulded both sides	
84 "	2in. six-panel do. do.	
23 "	2in. door, the lower part in one square, moulded both sides, the upper part sashed in small squares and extra wide bars, and with diminished stiles	
20 "	2in. do. do. in two panels, all as last	
44 "	2in. do. do. in one do. do., the top rail circular to segmental head	
30 "	2½in. entrance doors, with semicircular head measured square, the lower part in two panels moulded both sides, the centre part sashed in small squares and extra stout bars moulded both sides, the top part in semicircular panel moulded both sides and filled in with ornamental radiating and concentric bars, and with diminished stiles	

## FITTINGS AND FRAMINGS.

17 "	¾in. matched and V-jointed boarding as inclosure	
No. 1	Extra to forming door in do. for access to pipes	
41 "	1in. wrought both sides and cross-tongued shelf	
33 "	1in. do. do. and bearers	
29 "	1in. wrot both sides shelf and bearers (provisional)	
83 "	1in. do. and cross-tongued do. and do. (do)	
22 "	1½in. wrot and cross-tongued top framed for sink	
48 "	1½in. beaded cupboard front	
No. 2	Extra to forming and hanging doors in do.	
34 "	1½in. wrot framed and beaded inclosure No. 2 Extra to forming and hanging pair of folding doors in do.	
36 "	2in. framing, the lower part in one panel moulded both sides, the upper part sashed, and with diminished stiles and fixed	

## FINISHINGS, &amp;c.

415	Supl. ¾in. framed, splayed, and beaded grounds	
14 "	lin. wrought one side fascia	
141 "	lin. do. and tongued lining	
65 "	lin. do. do. and cross-tongued do.	
64 "	lin. do. tongued and rounded window board and bearers	
20 "	lin. do. do. cross-tongued do.	
No. 40	notched and returned ends to do.	
49 "	Eight mitres do.	
1½in.	rebated jamb linings tongued at angles	
65 "	1½in. double rebated do. do.	
281 "	1½in. cross-tongued do. do.	
19	Run Labour to groove	
6 "	" scribing ¾in. to brickwork	
19 "	" do. 1½in. do.	
10 "	" do. 1½in. do.	
15 "	" to bead	
12 "	" rebated joint in lin. shelf	
15 "	" stopped rebate	
24 "	" mitre of sash frame	
19 "	" splay and groove in bottom of 2in. casements	
23 "	" circular cutting to lin. fascia and scribing to arch	
23 "	" rounded nosing to 1½in.	
No. 1	mitre to do.	
122 "	Bead for glass, &c., screwed on and mitred	
8 "	do. circular	
257 "	do. fixed with brass-capped screws	
47 "	moulded bead in angle, doubled splayed at back	
632 "	¾in. narrow framed splayed and beaded grounds	
22 "	4½in. x ¾in. do. circular both edges to segmental arch	
32 "	1in. beaded pipe casing fixed with brass-capped screws to, and including deal grounds plugged to wall	
16 "	1½in. x 1in. shelf bearer plugged to wall	
6 "	1in. chamfered plinth 6in. high planted on	
No. 2	scribed ends to do.	
55 "	1½in. x 1in. chamfered and mitred fillet as architrave	
36 "	3 x 1 tongued and rounded window nosing	
No. 10	returned rounded ends to do.	



35	Run	4 x 1 nosing as last	£ s. d.
10	"	No. 12 ends do.	
10	"	No. 1 moulded fillet under window board	
8	"	No. 2 returned moulded ends to do.	
7	"	lin. lining, 6in. wide, tongued to circular window	
12	"	No. 1 rounded and rounded nosing	
14	"	No. 1 returned rounded end to do.	
6	"	2in. x 1 1/2in. moulding planted on	
16	"	2 x 2 hollow moulded fillet	
115	"	do. circular to semi-head	
	"	moulding 3in. x 1 1/2in. and planting on	
	"	do. 4 1/2in. x 1 1/2in. do.	
	"	No. 42 returned moulded ends to do.	
3	"	Four mitres do.	
	"	Moulding out of 3in. x 2in., and planting on	
	"	No. 2 mitred and returned moulded ends to do.	
3	"	Moulding out of 4in. x 2 1/2in. and planting on	
	"	No. 2 mitred and returned moulded ends to do.	
4	"	moulding out of 5in. x 2 1/2in. and planting on	
	"	No. 2 mitred and returned, moulded ends to do.	
9	"	moulding out of 6 x 4, as last.	
	"	No. 1 ends of do. scribed	
	"	1 do. do played	
14	"	One mitre	
12	"	Moulding out of 9in. x 6in. do.	
	"	do. raking	
	"	No. 1 apex mitre	
	"	3 played ends	
705	"	1 end scribed to brick moulding	
3	"	3in. architrave moulding and mitres	
	"	do. slightly circular to segmental head	
	"	No. 42 extra to played plinth blocks to skirting	
914	"	4in. architrave moulding and mitres	
23	"	do. circular, as last	
	"	No. 66 extra to played plinth blocks, as before	
	"	No. 4 mitres to lining, 6in. x lin.	
	"	1 deal dresser with 2in. top, 2ft. wide, on fir-framed legs, rails, &c. 3in. x 3in. with lin. potboard and rounded nosing, 1in. riser and bearers 1/2in., skirting 6in. high, three drawers with 1/2in. bottoms, 1/2in. sides, and 1in. beaded fronts, dovetailed together, and blocked oak runners, brass flush, drop handles, and drawer locks. The part above dresser to have 1 1/2in. wrought, cut, and shaped standards, three tiers of lin. shelves, splay rebated for plates, &c., lin. wrought and beaded fascia, and 4in. architrave moulding as cornice	

## CLEAN DEAL.

16	Supl.	lin. w.c. seat and riser (seat hung) and strong fir bearers	
9	"	1 1/2in. mitre, clamped flap, and framed and beaded frame	
4	Run	Labour to rounded edge on seat	
6	"	" " " " nosing on flap and frame	
26	"	1/2in. square skirting, 4 1/2in. high, plugged to walls	
	"	No. 5 tongued angles to do.	
	"	6 fair ends with rounded corners	
	"	2 notchings	
	"	No. 1 hole cut and dished in seat	

## OAK.

42	"	6in. x 3in. wrought, framed, sunk, weathered, throated, beaded, and grooved sill	
8	"	4in. x 4in. wrought, framed, stop, sunk, rebated and beaded do.	

## HONDURAS MAHOGANY AND FRENCH POLISHING.

23	Supl.	lin. w.c. seat and riser (seat hung), and strong fir framed and dovetailed bearers	
13	"	1 1/2in. mitre clamped flap and framed and beaded frame	
6	Run	Labour rounded edge on lin.	
7	"	thumb moulding tongued on	
25	"	No. 12 fair ends to do.	
	"	1/2in. beaded skirting, 4 1/2in. high, plugged to wall	
	"	No. 6 tongued and mitred angles	
	"	6 fair ends, with rounded corners	
	"	No. 2 holes cut and dished in seat	
	"	2 " " and beaded for handles	
	"	4 scribing lin. to deal moulded skirting	
	"	1 lin. framed, dished, and shaped bath top 6ft. x 2ft. 6in., rounded on edge and grooved for inclosure	
	"	Attend plumber to—	
	"	No. 3 w.c.s.	
	"	2 sinks	

## IRONMONGERY OF THE BEST DESCRIPTION, INCLUDING SCREWS AND FIXING TO DEAL.

20	pairs	2 1/2in. wrought-iron butts	
8	"	3in. do. do.	
33	"	4in. do. do.	
2	"	5in. do. do.	
2	"	15in. cross garnets	
2	"	4in. iron neck-bolts	
2	"	4in. brass do.	
3	"	9in. iron barrel do.	
6	"	9in. brass do.	
2	"	brass w.c. latches and private bolts	
15	"	6in. iron rim locks, with brass furniture both sides, and patent spindles	
17	"	6in. mortise locks, with furniture and patent spindles, average 7s. each p.c.	
3	"	8in. stock locks	
1	"	strong drawback lock and brass furniture	
1	"	lock p.c. 5s.	
1	"	do. Chubb's 20s. p.c.	
33	"	sets of long and short finger-plates, p.c. 5s. per set (averaged)	

1	letter-box with plate on door, complete, p.c. 30s. £ s. d.	
9	japanned iron lever casement fastening	
9	do. stays	
5	brass lever casement fastening	
5	do. stays	
30	brass screw cupboard knobs and roses	
14	do. spring sash fastenings, p.c. 1s. 6d. each	
80	averaged	
14	do. do., p.c. 2s. 6d. each	
80	do. sash lifts	
77	do. pull-down handles	
1	Adams's patent fanlight opener, p.c. 25s.	
1	brass knob turn-buckle	
1	iron do.	

## SUNDRIES.

11ft.	Supl.	perforated zinc, fixed with screws to frame	
2	"	do. fixed with beads	
155ft.	"	Run galvanised wrought-iron water bar bedded with white lead in oak sill, including grooves	
	"	No. 16 iron dowels and mortises in fir and York stone	

Carried to summary ...

## BY-LAWS OF THE BOURNEMOUTH COMMISSIONERS.

WE have received a copy of the by-laws relating to new streets and buildings made by the Improvement Commissioners, as the urban sanitary authority, for the district of Bournemouth, under the Bournemouth Improvement Act, 1856. The provisions agree with those of the Model By-laws as to exempted buildings and the width and construction of new streets. The diagrams explaining the exempted private buildings, not more than 30ft. in height nor more than 125,000c.ft. in extent, and also those exceeding that height and capacity, are useful. In the former case 30ft. clear is necessary on the two sides and rear, and 8ft. to the nearest street; in the latter the distances on the sides and rear from the boundary of adjoining land or premises is 60ft., and 30ft. is the distance prescribed from the nearest street. The other illustrations accompanying the text have been copied from Knight's "Annotated Model By-laws." Thus the sections of walls give the thicknesses fixed by the by-laws. With these rules and explanatory sections any builder can instruct himself as to the requirements. Recesses in walls, chimneys, and other structural matters are illustrated. The most useful part of the pamphlet is that relating to the drainage of buildings. Plans of subsoil drains, sections of disconnecting traps with air inlets, main drain disconnection, and other details are given. We congratulate the urban local authority and their surveyor, Mr. G. R. Andrews, on the prospect of placing all building operations under the by-laws. The future of Bournemouth as a resort for invalids will be very fully bound up with the sanitary regulations in force within the district, and the authorities could not have accomplished a wiser measure of legislation.

## BOOKS RECEIVED.

*Movable Wooden Churches*, by W. JEFFREY HOPKINS, F.R.I.B.A. (Worcester: E. G. Humphreys.) Mr. Hopkins, of Worcester, has just published a second edition of his pamphlet, setting forth the advantages to be derived by the adoption of movable wooden churches for temporary purposes over the ordinary iron ones. He states that both for cheapness and comfort wooden structures are preferable, and as to the former condition, he states that a building seating 200 adults, and containing 1,440 superficial feet, would cost, complete in wood, with double-boarded walls, filled with sawdust, block-flooring, and wooden asphalted and slated roof, and chairs, £324, or 4s. 6d. per foot super, whereas the commonest iron structure would cost 6s. 11 1/2d. per foot super, exclusive of brick or masonry foundations. Wooden buildings would also, Mr. Hopkins says, compare favourably in appearance, and possess greater facility of erection and removal. *Walks in the Ardennes*, by PERCY LINDLEY. A new edition of this well-written guide to the picturesque scenery and towns on the banks of the Meuse and Moselle has been published for the autumn holidays, under the auspices of the Great Eastern Railway. It is illustrated by numerous sketches, and will afford many useful hints to the intending tourist, who will find Luxembourg and South-Western Belgium provide fields for inexpensive and interesting

trips.—*The Glasgow Architectural Association Sketch-Book*, Vol. III. for 1888, has just been published, and comprises several excellent sketches and drawings. Mr. W. Fergusson's sketches of old houses and Newark Castle, and those by Mr. G. Washington Browne of Bablake Hospital, Coventry, and Manor House at Ockwells, are very feelingly drawn in pencil. St. Mary Magdalene College gateway and old houses, Chartres, by Mr. H. D. Walton, are also of interest. Half-timber work appears to have had a charm for our younger architects north of the Tweed. Some picturesque houses at Tunbridge and Chiddingstone, Kent, are contributed by Mr. G. W. Browne. Mr. Andrew W. Prentice sketches pulpit in the refectory Chester Cathedral, and Nantwich Church—both interesting subjects. We must also mention the sketches and drawings of Lincoln Cathedral, including its north-west transept, galilee porch, and south-west pinnacle, the measured drawings of cloisters, and the organ screen and door to choir by Alex. M'Gibbon. Henry D. Walton's gateway of St. John's College, Cambridge, John Begg's of Howden Church, and Rievaulx Abbey, are vigorous and clever. Drawings and sketches of Dunblane Cathedral and Dryburgh Abbey, Fortrose Cathedral, by John James Joass; Furness Abbey, by William James Anderson; Kelso Abbey, by Alexander M'Gibbon, are among the plates of the present interesting volume.

## BAKERS' OVENS AT DOVER.

THE brick crowns of the ovens are turned upon a sand core beaten hard and formed as required. This is removed when the crowns are thoroughly set. In the case of the ovens illustrated the crowns were formed of hard paving bricks from Cheriton, placed on end, breaking joint, and grouted with lime and coarse gravel. The levelling up over crowns may be brickwork or lime concrete. The sides of the ovens are also formed of Cheriton bricks on end edgewise—i.e., 4 1/2in. thick. The paving tiles forming oven floors are laid in sand to allow for expansion; if laid in the usual way, they would "buckle" when the ovens were heated. Care should be taken that no pebbles or other hard substances find their way into the joints of the floor tiles. 1in. iron tie rods should be fixed immediately above the crowns with long arms to hold in the sides of the ovens, two or three from left to right, and two in each oven from front to back. Stout hoop iron should also be used without stint in the walls. The oven door, boiler, furnace, fire bars, ashpit door, damper, and fire lumps for sides and top of furnace are trade articles, but a larger boiler than that usually supplied with these sets is desirable—say, one to hold 20 gallons for each oven. The use of cement in any part affected by the heat is considered objectionable. As regards the asbestos for the sides and top, Bell's first quality is, it is almost superfluous to say, greatly superior to the second quality, and architects should not only specify the former, but "see that they get it."

The Tunstall local board of health rescinded, last week, a resolution passed in September, 1885, appointing the present surveyor (Mr. A. R. Wood) to that office, at a salary of £100 a year, and a percentage on extra work; and agreed to pay him a salary of £150 a year, such salary to include remuneration for all the duties of surveyor as defined by the Public Health Act 1875, but to be exclusive of any architectural work, which the Board will deal with as it arises. It appeared that during the time the surveyor had been in office under the Board his salary and commission had averaged £158 per annum, so that by passing these resolutions the Board would be saving £8 a year.

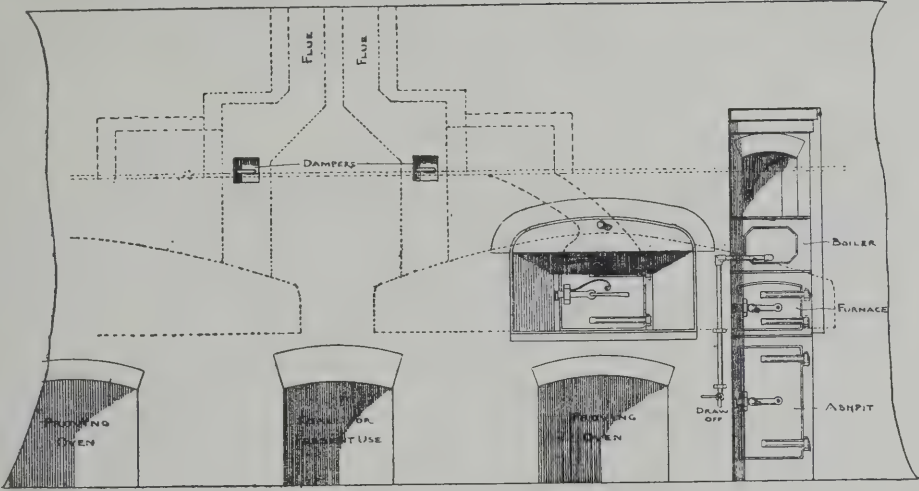
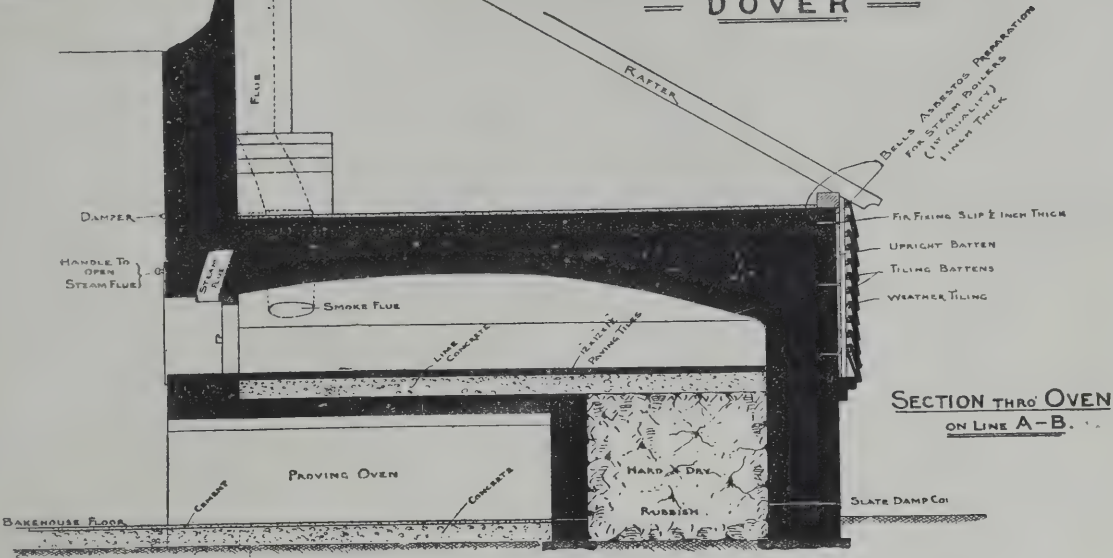
Chenonceaux, the mansion in the Touraine built by Francis I. for the Duchesse d'Etampes, and afterwards occupied by Catherine de Medici, Queen of Henri II., and chief instigator of the St. Bartholomew massacre, is announced for sale at Tours on the 15th of September. The chateau, which is probably the most picturesque of its class in France, was illustrated from a sketch by Mr. Ernest George in the BUILDING NEWS for December 25, 1874, and from Mr. Edwin Seward's drawing in our issue for August 13, 1880.

The work of restoring the Church of St. Peter, at Little Driffield, from plans by Mr. Temple L. Moore, of London, is about to be commenced by Messrs. G. Shepherdson and Son, of Driffield. The cost will reach about £1,000.

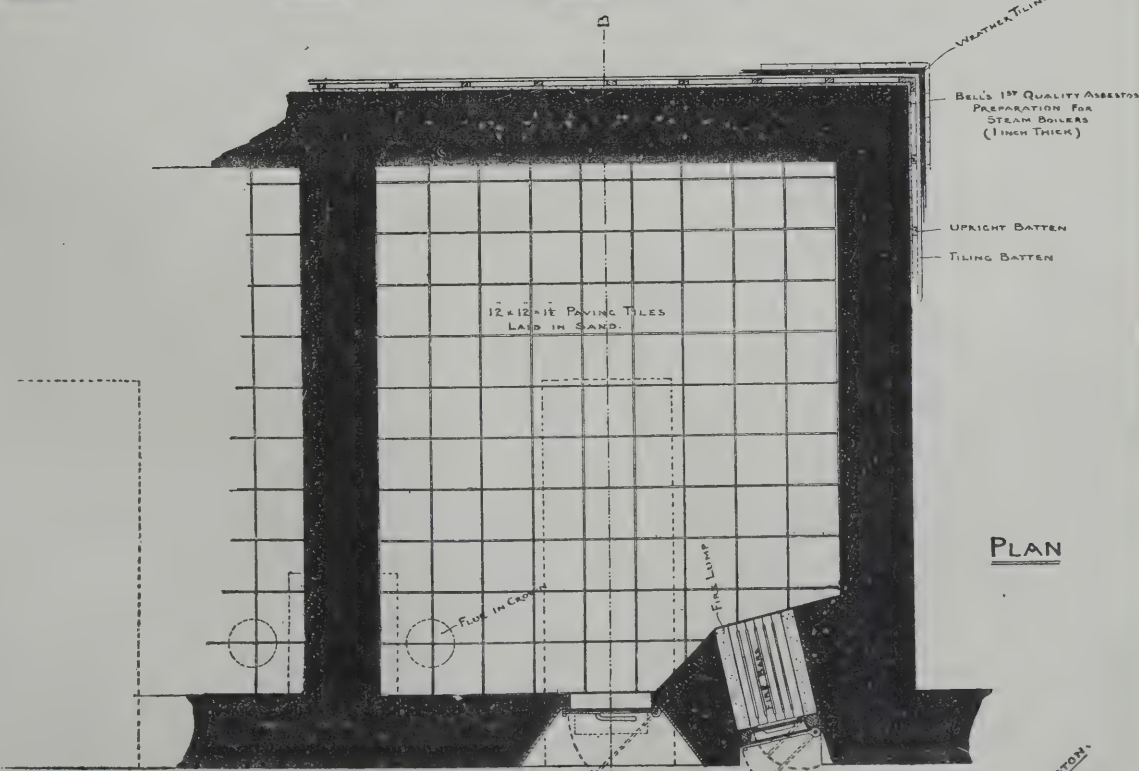


**BAKER'S  
OVENS**

FOR RIVER AND DISTRICT  
CO-OPERATIVE SOCIETY, LIMITED  
— DOVER —



**ELEVATION  
OF OVENS.**



SCALE OF FEET

W. BEESTON  
DOVER  
JULY 1888



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FOR A GARDENER'S COTTAGE.—BAKERS' OVENS AT  
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## OUR LITHOGRAPHIC ILLUSTRATIONS.

ARCHITECTURAL ASSOCIATION EXCURSION  
SKETCHES.

For description, see p. 231.

R.C. CHURCH OF ST. JOHN THE BAPTIST,  
BRIGHTON.

THE view of the interior of St. John's Church, reproduced from the drawing in the Royal Academy Exhibition of this year, shows the entrance end of the building as designed to be changed in appearance by the removal of the old flat, plastered ceiling, the decoration of the timbers of the existing sound and strong queen-post roof, and the construction of an ante-chapel under the gallery for the use of those who may wish to make visits of devotion at times when the rest of the church may be closed. As shown in the view, confessionals are to be erected and the gallery rearranged with the central portion as a chapel of the Holy Rood, having space on one side for the organ, and on the other a tribune for the nuns of the adjoining convent. The church was erected somewhat more than fifty years ago with the small effort at architectural effect characteristic of the period; but to the credit of the builder, who was also the architect, it is a solid construction. The sculptured altarpiece in white marble is a fine work by Carew, as is also the memorial to Mr. Fitzherbert. There are other sculptured memorials and works of interest, all of which will be carefully preserved. A view of the proposed work to the exterior of the church, with a plan, was given in the BUILDING NEWS of June 24th, 1887. The architect for the whole of the work is Mr. S. J. Nicholl, of 1, Caversham-road, London, N.W.

## PROPOSED CHILDREN'S HOSPITAL, HULL.

THE erection of this building was intended to be in celebration of Her Majesty's Jubilee, and will supply a long-felt want in Hull, as the accommodation in the existing hospital in Storey-street is totally inadequate to the growing necessities of the town. It has been designed to accommodate sixty inmates, fifty being provided for in wards on the first and second floors, and on the latter floor is also planned a small ward for four cots in close proximity to the operating-room. In addition to these, a ward for six cots is obtained on the second floor, totally cut off from the rest of the building, being reached by an independent closed staircase, which is entered from a covered way outside the building, and is intended for the isolation of children who may develop infectious disorders during their stay in the hospital. The accompanying plans will explain the provision made for the several departments, and in them it has been sought to combine the advantages of the pavilion system with due regard to economical construction. The limited area of the site has somewhat hampered the design, its very central

situation having recommended it to the committee charged with the erection of the building. The hospital being intended for children has been a guiding principle in the preparation of the design, the capacity of the wards, &c., being regulated with due regard to that important consideration. The nurses' rooms are placed in mezzanine floors opening from the first floor staircase landing, but entirely cut off from the building. The domestic servants are placed in the rear of the wards, their rooms being reached by a separate staircase. Attached to the hospital, but fronting another street, is the out-patients' department, in which a most important part of the hospital's operations are carried on, and the absence of which has greatly crippled the work done in the present building. It is intended that the building shall be erected in red pressed Lincolnshire bricks, stone being used when necessary, and that as to sanitary arrangements, ventilation, &c., it will be supplied with the most approved appliances which the construction of hospitals has hitherto developed. The design was selected in public competition, and is by Mr. Samuel Musgrave, F.R.I.B.A., 18, Trinity House-lane, Hull.

"BUILDING NEWS" DESIGNING CLUB.—A  
GARDENER'S COTTAGE.

THIS sheet is the last drawing to be published in our series of BUILDING NEWS Designing Club illustrations for 1887-8. It illustrates "Boreas's" design for a Gardener's Cottage, which was placed second in the late competition. The first design, together with a notice of the whole number of plans sent in for this subject, will be found printed in our issue for July 20th last.

## COMPETITIONS.

"OWEN JONES" PRIZES.—This competition was instituted in 1878 by the Council of the Society of Arts, as trustees of the sum of £400 presented to them by the Owen Jones Memorial Committee upon trust to expend the interest thereon in prizes to "Students of the School of Art, who, in annual competition, produce the best design for household furniture, carpets, wall-papers and hangings, damask, chintzes, &c., regulated by the principles laid down by Owen Jones." The prizes are awarded on the results of the annual competition of the Science and Art Department. Six prizes were offered for competition in the present year, each prize consisting of a bound copy of Owen Jones's "Principles of Design" and a bronze medal. The successful candidates are:—James J. F. King, Glasgow, design for Persian carpet; Herbert Cole, Manchester, design for carpets; Andrew Richmond, Glasgow, design for printed hangings; Emily Batters, Hertford, design for tiles; Samuel H. Moss, Macclesfield, design for tiles; and George Pettitt, Manchester, design for printed hangings.

ARCHITECTURAL & ARCHÆOLOGICAL  
SOCIETIES.

ARCHÆOLOGICAL CONGRESS AT GLASGOW.—The programme of the Congress of the British Archæological Association, which opened on Monday at Glasgow, includes visits to Stirling Castle and Bannockburn, the Royal Palace at Linlithgow and the Roman wall near Falkirk, Dumferline Palace and Abbey and the tomb of Robert Bruce, Lanark and the falls of the Clyde, the Castle of Doune and Dunblane Cathedral, Paisley Abbey, Rothesay Castle and other old buildings and remains in the Isle of Bute, Bothwell and Craignethan Castles, the field of the Battle of Langside, &c. The members will also inspect the cathedral of Glasgow and the pre-historic hill fort near Langside, and possibly also Dumbarton Castle and Newark and the termination of the Antonine wall. The Congress will be entertained by Lord Bute, who has accepted the office of president, at his new palace, Mount Stuart, in the Isle of Bute, and at a *conversazione* to be given by the Lord Provost and magistrates of Glasgow.

The Eiffel tower in the Paris Exhibition grounds is making good progress, a total altitude of 390ft. out of the projected 934ft. having been attained by the finished ironwork. The cost is expected to come well within M. Eiffel's original estimate of £160,000.

NATIONAL REGISTRATION OF  
PLUMBERS.

ON Saturday afternoon the diplomas granted under the movement for the national registration of plumbers for the district of Aberdeen, Banff, and Kincardine Shires were distributed in one of the classrooms of Robert Gordon's College, Aberdeen. Sheriff Brown distributed the diplomas. Before doing so, however, Mr. Brown expressed the lively satisfaction he felt in the opportunity afforded him of showing his sympathy with a movement that he believed to be sound to the very core. He understood that the national system which was sought to be promoted for Scotland had been affiliated on the Worshipful Company of Plumbers in London, and that already there had been formed six district councils in Scotland, that for this part of the country including Aberdeenshire, Kincardineshire, and Banffshire. He was informed by the secretary that 3,000 persons had already been enrolled in the Association, and that 79 of them belonged to this district. This was not merely a trade interest, but a movement in the highest sense consecrated to the public service, for which their interest and sympathy were invited. Dr. Matthew Hay, in the course of an address, dealt with the origin of the movement. He expressed the hope that the Scottish Society, which had not, so far as he knew, met with such general support throughout Scotland as to justify a separate existence, would allow its system of registration to become merged into that of the Plumbers' Company, which had now root in every town in the kingdom.

## CHIPS.

Mr. J. C. Pardoe, assistant surveyor to the Merthyr Tydfil local board, has been elected surveyor and inspector to the local board of Barry and Cadroxton.

A Jubilee clock has been erected in the tower of Crowland Abbey, and was unveiled on the 9th inst. The dial is 10ft. in diameter, and the clock is provided with chiming apparatus. Mr. James Dawe, of Wisbech, is the maker.

The Archæological Section of the Birmingham and Midland Institute visited Chester on Thursday, Friday, and Saturday last. The cathedral was visited under the conduct of Archdeacon Barber; Mr. Shrubsole, of Chester, acted as guide on the Walls and in the Museum, and Mr. Ewen took the visitors about, behind and beneath the Rows. On the closing day a visit was paid to Hawarden Castle.

The Glasgow District Board of Lunacy resolved on Friday, anent the claims by Messrs. Bruce and Hay, architects, and Mr. John Dansken, measurer, for work done in connection with the abandoned asylum project at Hartwood, to settle them for £2,375 and £1,199 15s. respectively, as against £3,000 and £2,000 originally charged.

Works of drainage have just been carried out in the village of Shoreham, near Sevenoaks, Kent. Mr. Hennell was the engineer, and Mr. Lansbury, of Bromley, Kent, the contractor.

New waterworks are being constructed for the Northwich Local Board at Cotebrook, and were formally inspected by the members of the board last week. Mr. Bancroft is the engineer; Messrs. Hughes and Son, of Dudley, are the general contractors; and the cottage, committee-room, and other buildings at Cotebrook are being erected by Mr. Fleet, of Tarporley.

Col. Walter Mardon Ducat, R.E., Local Government Board Inspector, held an inquiry at the Town Hall, Gateshead, on the 8th inst., respecting the proposal of the Corporation to borrow £1,556 for improvements at Saltwell Park and Windmill Hills.

Saint Michael's Church, Stockland, Chard, was formally reopened for Divine worship on Tuesday week, after undergoing thorough restoration. New seats and floors have been placed throughout, pitch-pine open benches replacing the box-like pews. The chancel floor is laid with specially designed encaustic tiles, manufactured by Godwin and Son, of Lugwardine, near Hereford.

A stained-glass window, representing the Apocalyptic vision of the New Song, has been placed in All Saints' Church, Blackburn, as a memorial. It was executed by Mr. Swaine Bourne, of Birmingham.

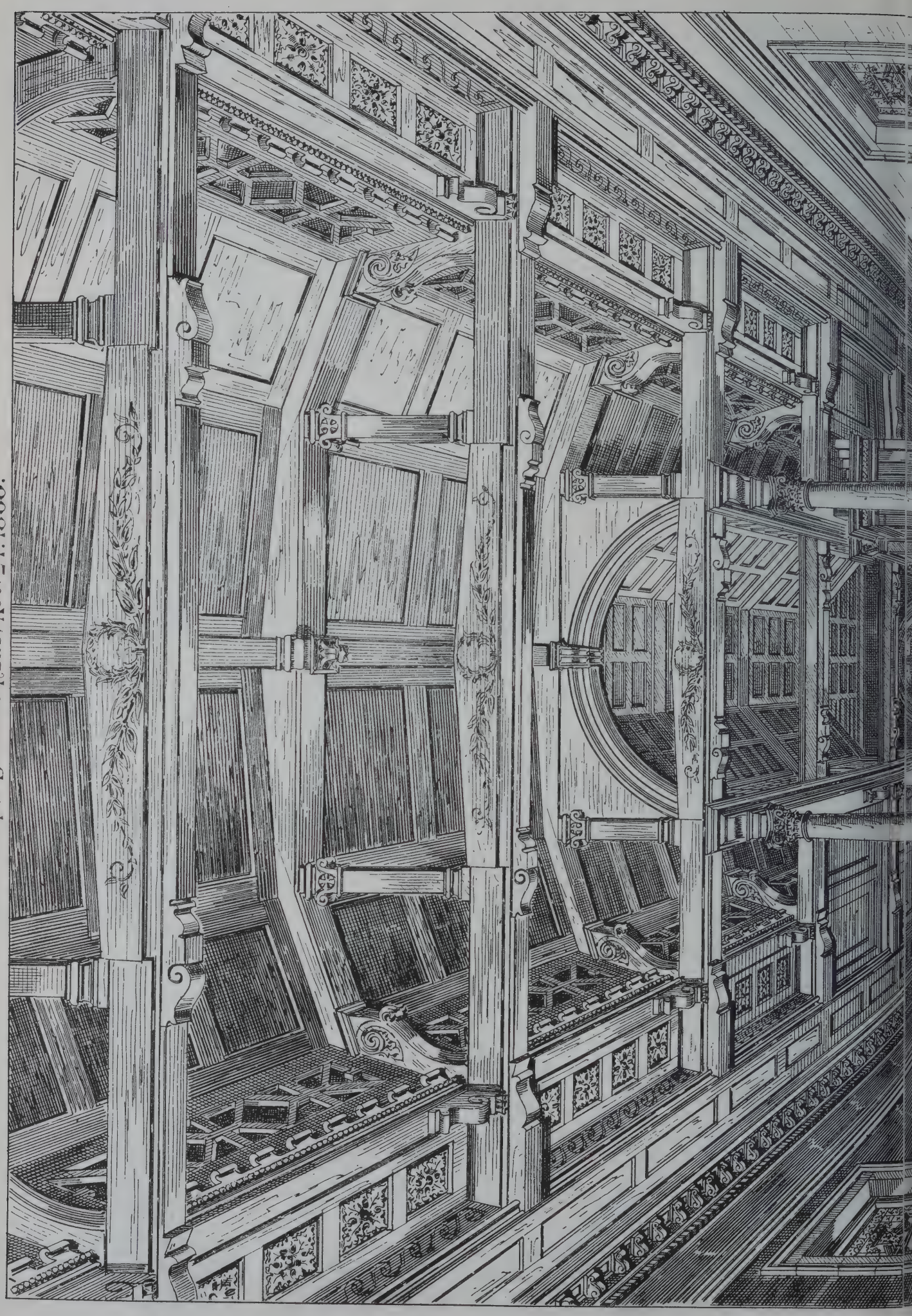
The new schools, St. Clare's Convent, Pantasaph, for which Mr. E. Kirby, of Liverpool, is the architect, are warmed and ventilated by means of the patent Manchester grates, supplied by Mr. E. H. Shorland, of Manchester and London.



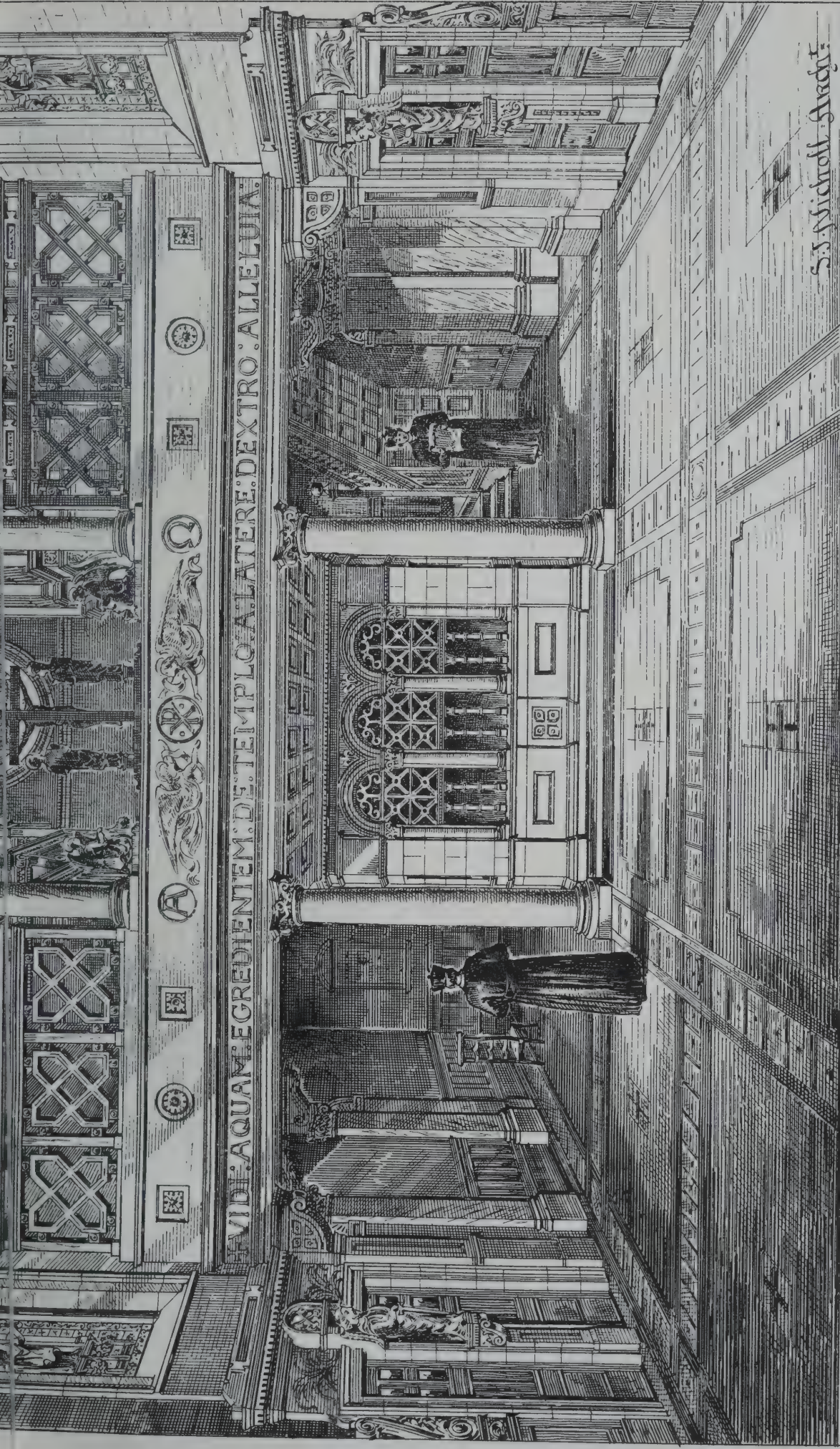




THE BUILDING NEWS, AUG. 24. 1888.







LAUDI: AQUAM EGREDIENTEM: DE TEMPIO A LATERE: DEXTRO: ALLELUIA.

S. J. Nicholl. Architect.

# CHURCH OF ST. JOHN THE BAPTIST AT BRIGHTON







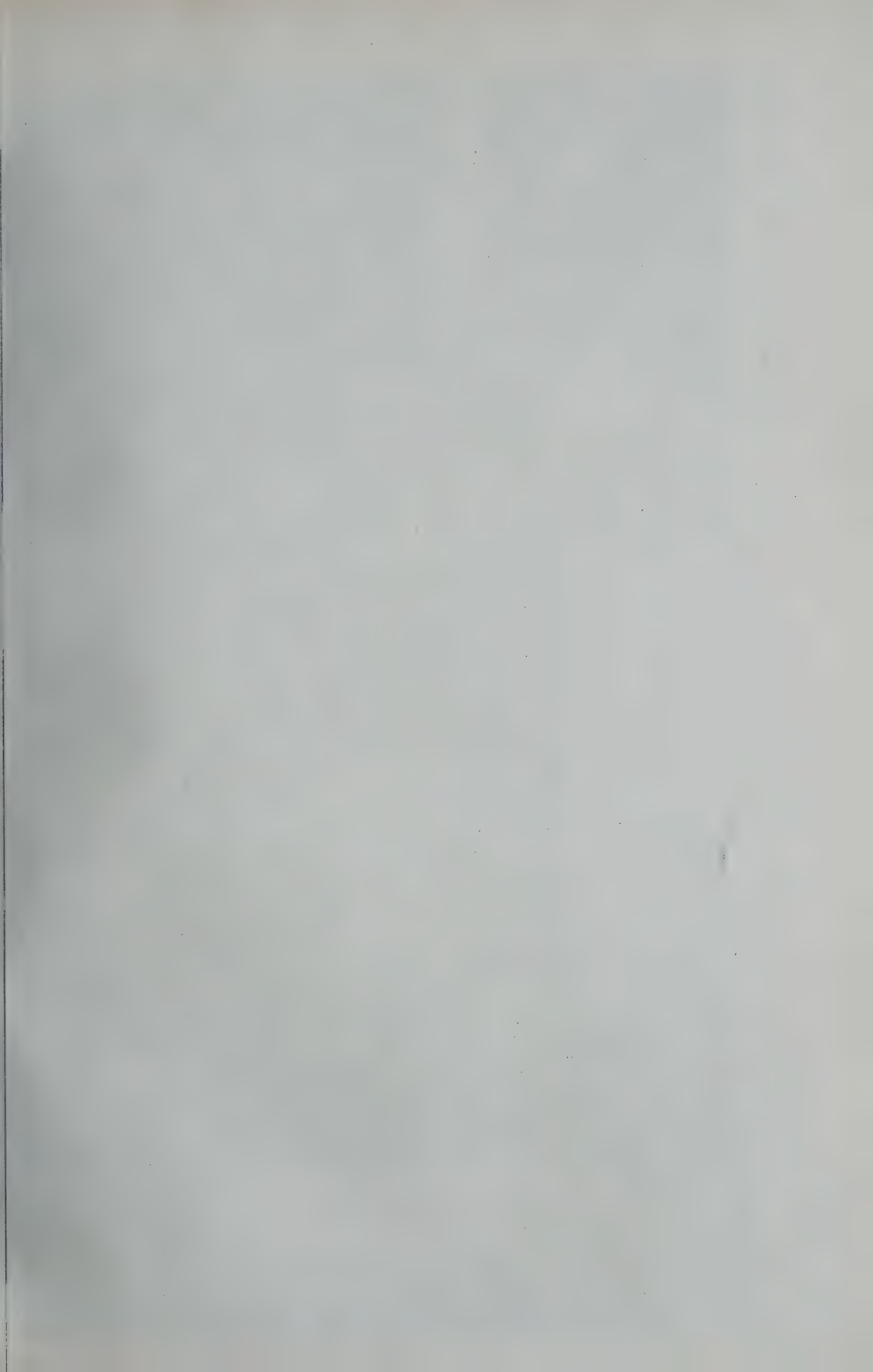




THE BUILDING DEWS, AUG. 24, 1888.

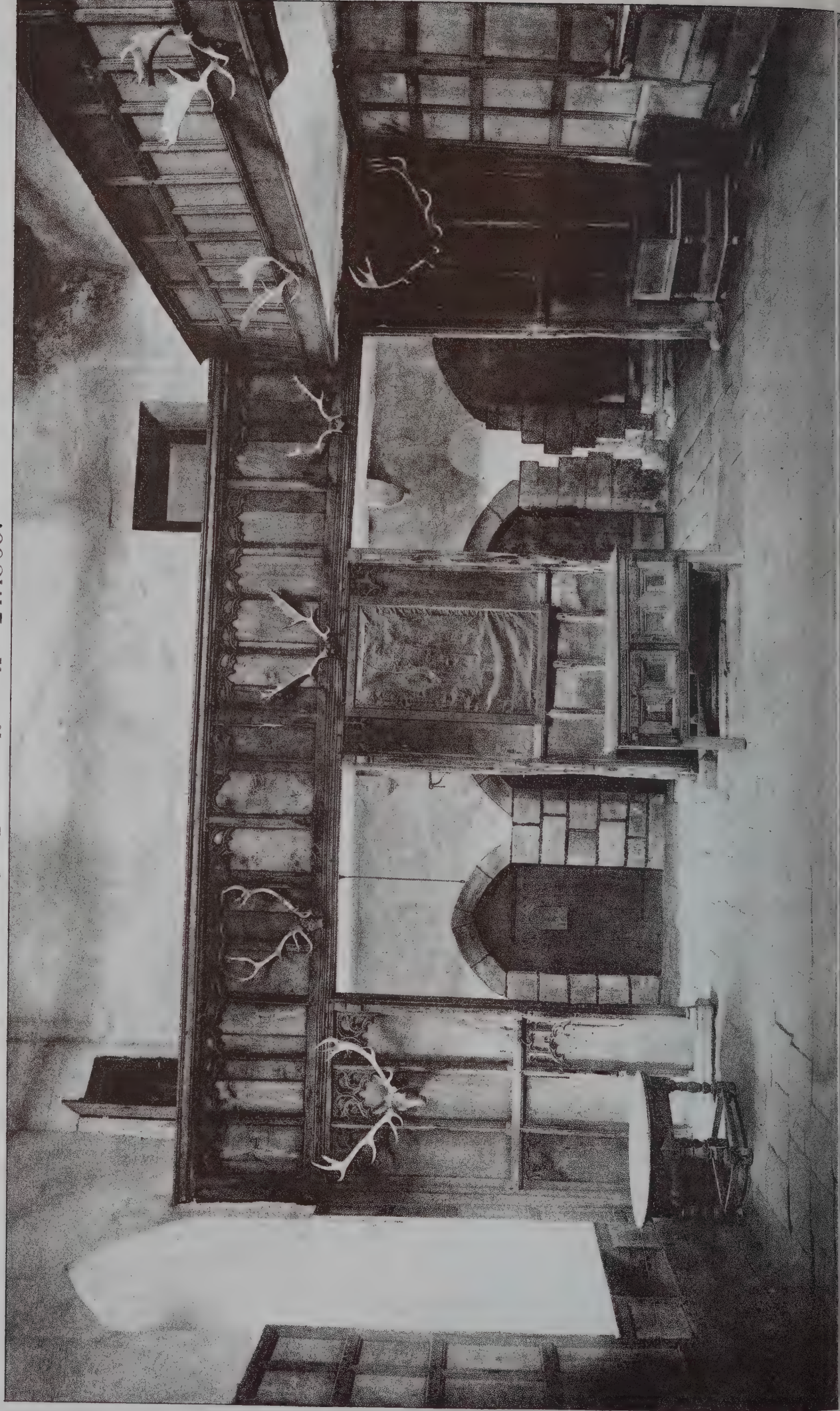








THE BUILDING DEWS, AUG. 24, 1888.










THE BUILDING NEWS, AUG. 24. 1888.





# "BUILDING NEW" DESIGNING CLUB

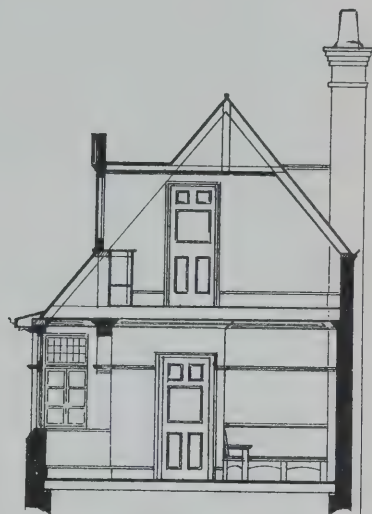
## A Gardener's Cottage to be used as A Lodge

Scale  Feet

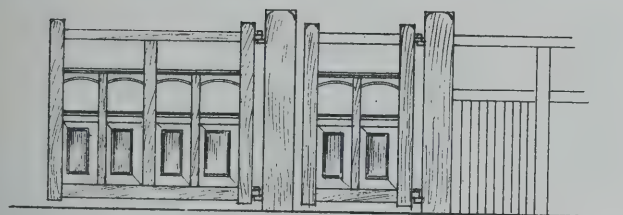


Front Elevation

"BOREAS"



Section



Entrance Gates

Scale  Feet

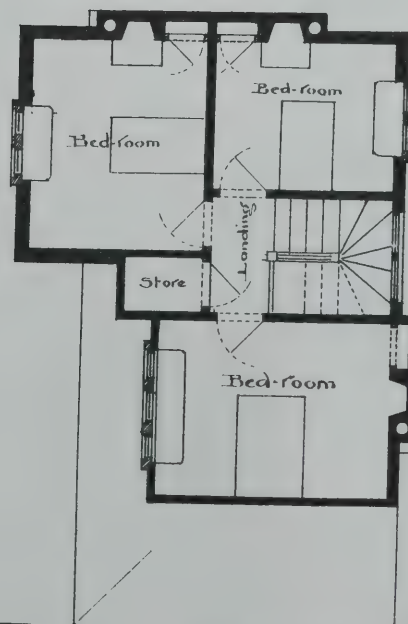


Sketch



Ground Floor Plan

Placed  
Second



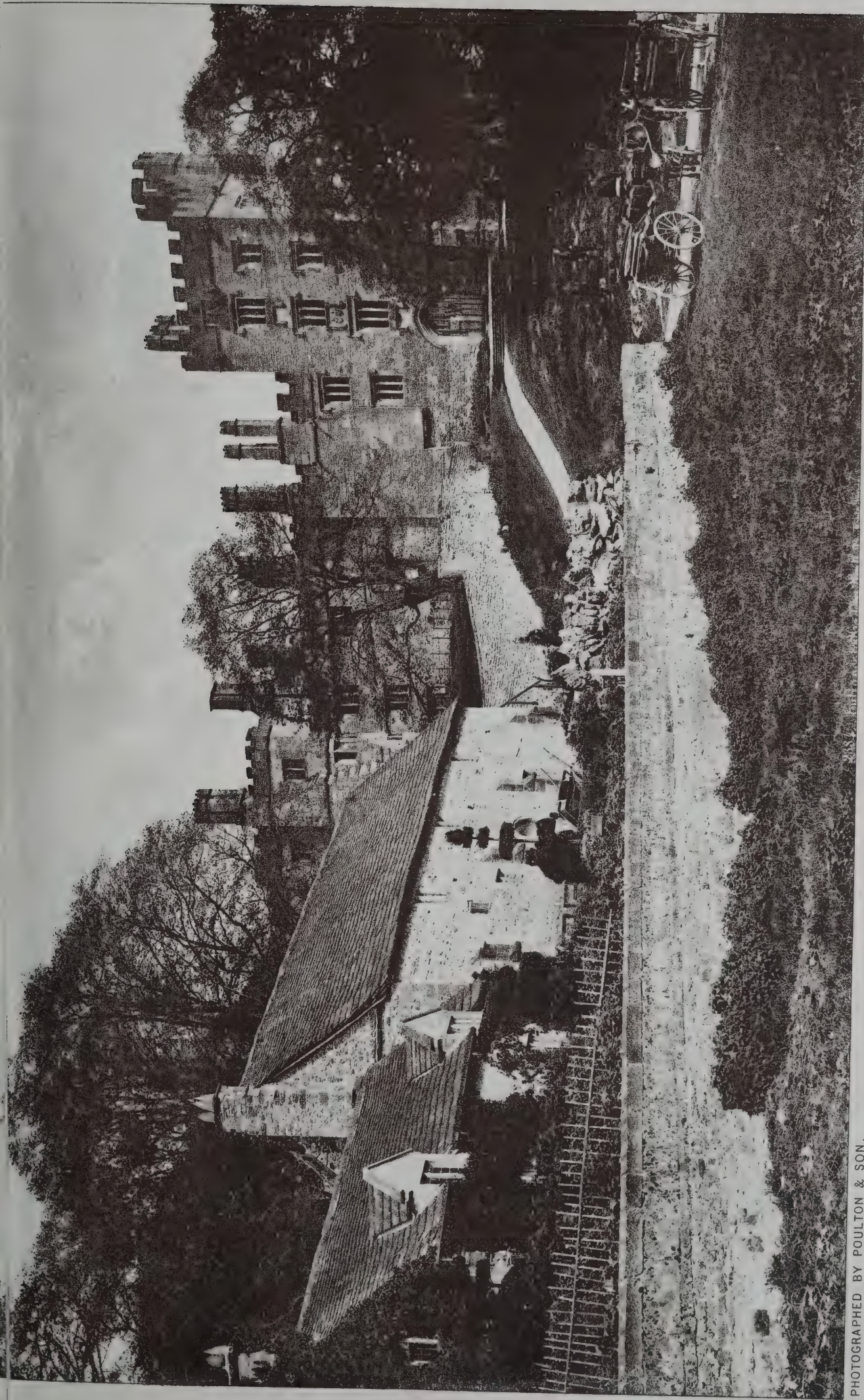
Upper Floor Plan

June 1888









PHOTOGRAPHED BY POULTON & SON.

ARCHITECTURAL ASSOCIATION · EXCURSION · 1888

PHOTO-TINT, by James Akerman, 6, Queen Square, London, W.C.









PHOTOGRAPHED BY POULTON & SON.

ARCHITECTURAL ASSOCIATION · EXCURSION · 1888

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.







## WAYSIDE NOTES.

I AM glad to see the enthusiasm with which the representative Committee of the Wood-carvers of London are endeavouring to raise the standard of the present English school of wood-carving; and I trust that the Council of the Institute will extend its sympathies to the craft, in response to the humble petition which was recently sent to Conduit-street. One feels greater interest in the new undertaking of the Wood-Carvers' Committee, because it is just what we were advocating lately, as the only thing calculated to counteract scamping workmanship of the "cheap and nasty" order, which has been so far fostered under Mr. Buggins's gentle care. Cannot a few more craftsmen emulate the example of the wood-carvers? The stone-masons should go hand in hand with the wood-carvers; and as masonry is the soul of architecture, great things might reasonably be expected to result from such an action. The trades, however, that should really co-operate more and sympathise more with the wood-carvers are the joiners and furniture-makers. Something is badly required to checkmate "sweating" in these trades; and, besides this, more sympathy between them and the wood-carvers would lead to the production of more really artistic joinery and furniture. The marked improvement in the design of furniture, in late years, does not, I fear, go hand in hand with any advance in solidity of construction. Let the trades concerned, then, invite the wood-carvers, and look about for some means of improving their position and doing away with sweating and sweaters.

It is curious to reflect that the most creditable workmanship in the building trades is performed in restoration jobs. I suppose that all concerned are ashamed to work badly when they find the old work so thoroughly done. Or perhaps it is that there is no speculation about it, and that nothing is undertaken that cannot be paid for at a fair price. Money for restoration work seems too "easy." The energetic measures taken to procure funds for the restoration of Peterborough have resulted in new subscriptions to the amount of about £4,365—not a very great sum for such a building it is true, and not likely to last long in an English restoration. In a French church a matter of from £4,000 to £5,000 would keep them busy for years, but then the method of procedure differs so in the two countries. Here we make a clean sweep (very much so at times) in a few months of the whole affair, whilst in a French cathedral or church they appear to go on the principle of keeping two or three men permanently pottering about the building. Theoretically, the foreign method would be the better of the two, as being more consistent with the "stitch in time saves nine" policy which should equally apply to the repairs of churches as to the mending of coats.

Touching restorations, I observe that your correspondent, Mr. Carpenter, has taken exception to my leading notes of the 10th inst. It puzzled me for a long time to reconcile my criticism with the thing criticised, and with your correspondent's letter. I now find, on looking through the *Institute Journal* of the 31st July, that Mr. Carpenter has been pleased to imagine that I was criticising his article on "The Restoration of Ancient Buildings," whereas, on referring more carefully to my notes, he will find that I alluded to the "numerical paragraphs" on "General Advice to Promoters of the Restoration of Ancient Buildings," contained in the same number. At the time of writing I was positively unaware that your correspondent had contributed anything to the *Journal* in question. The mystery being thus explained, it is unnecessary for me to say more about the subject, other than to beg to state that I still hold fast by my opinions expressed on the 10th of this month. I trust, however, that Mr. Carpenter will, in future, be more cautious, and ascertain that criticism really alludes to his work before taking exception to the opinions expressed.

Liverpool-street Station is to be enlarged at a cost of a million sterling. Great preparations are being made for the new work. Property on the west side of Bishopgate-street is now being demolished. In connection with the improve-

ments at the terminus, two additional lines of rails will be put down as far as Bethnal-green Junction, which, so far as I can understand, will be a curious piece of engineering. It is stated that the new lines will run underground. The Great Eastern Railway is a go-ahead line, and slowly and surely improving, both as regards its system and railway-station architecture, which at one time was anything but grand in some places.

Ship canals are becoming a mania. Even before the success of the Manchester undertaking is assured there are rumours of the probable construction of a canal between the Bristol and English channels, and one also between Sheffield and the sea. The proposed route of the former is from the North Somerset coast to Seaton, on the South Devon coast, via Taunton. Rough estimations put the probable outlay at £70,000 per mile. Costly undertakings are these inland waterways for ocean-going vessels. The distance from the Bristol Channel to Seaton is about forty-five miles, and anyone able to tackle the intricate mathematical problem involved may arrive at the total cost, and ask, with the young competing architect, whether the game is likely to be worth the candle, as, in addition to this, will be the cost of constructing harbours of refuge; the whole being for the benefit of Bristol, by enabling mariners from the East-Coast ports and the North of Europe to avoid the necessity of doubling Land's End. The Sheffield Chamber of Commerce has under consideration the proposition to construct a ship-canal to their town, which canal, it is proposed, shall conduct to the boisterous North Sea at or near the Port of Goole.

The Local Board of Health for the district of Newton Heath know how to kill two—if not several—birds with one stone. A free library is one thing, baths are another thing, and an assembly-room is something else. Yet in the recently-announced competition all these and other features are to be included in one building. As the inhabitants of Newton Heath want so much for their money, they might at least have let us off the half-a-crown entrance fee which I see must be paid for instructions and particulars.

Of the various more or less sensational topics broached to fill the columns of the dailies in the silly season, the most interesting, from our point of view, is the question of the daily opening of churches. This discussion, carried on in the *Times* and *Standard*, and, for all I know, in other papers, was started by the Archbishop of Canterbury and Lord Carnarvon. Every architect will throw in his voice in the direction of opening churches. Putting aside theological questions as out of place here, how many an old interesting building have we all missed seeing, because of the selfish closing of doors that obtains in the Established Church of England! To make matters worse, it is not always that the worthy sexton lives hard by the old village church, and a search for his abode often consumes much precious time. Even when found, it is only in exceptional cases that one is allowed to take the keys and inspect the building quietly, but we must await the leisurely old gentleman, and, perchance, listen to his long yarn about hideous monuments, when we would peacefully study the old architecture. I have long ago learned to give up the attempt to see the interiors of many English village churches in the ordinary week-day, though on a Saturday one may have better luck. Fortunately for the half-holiday tramps of the student, Sunday-eve is the best time for a ramble amongst country churches, as then, more often than not, cleaning and tidying operations are conducted in preparation for the services on the morrow.

There is a selfishness about this closing of the doors of Anglican churches that is very repugnant to those who have been accustomed to the open and inviting portals of Continental cathedrals and churches. Instead of arriving at the building and shaking a rusty door-handle and rattling the bolts in their sockets, as we are so used to do in this country, we find wide, liberal doors thrown open, enabling us to obtain one of those enchanting glimpses of the interior, which

forms our first introduction to so many new buildings on the Continent—scenes which not a few holiday-making architects and students are at the present time enjoying—glimpses of misty arcades receding towards the far end of the apse, where the sombre air is relieved by the scintillations of stained-glass windows. Many will call to mind pictures of enchanting beauty formed by this peep into a cool Continental interior, framed by the sun-lit, richly sculptured, and much moulded orders of the great west portal—pictures we seldom or never see in this country, because our church doors are shut against the multitude, and because, as Mr. Ruskin has said, the typical English west portal is as insignificant as the entrance to a beehive.

I have inspected the large picture of "The Ascension" which Mr. W. Cave Thomas has been engaged upon for some time past, intended to be placed over the altar at Christ Church, Marylebone. The artist has ably embodied the scene as described in St. Luke's narrative. There is a lower group composed of seated figures of St. Peter and St. John, and the other nine of the disciples round a mound of rock, the distant blue hills bounding the horizon. SS. Peter and John occupy prominent positions in the foreground; they are represented in an attitude of wonder and prayerfulness, and the colouring of the draperies are strong and luminous. In the background the other disciples are shown with hands clasped, some of them as if aroused from sleep. The Saviour is, of course, the central figure in the upper group. He is in the act of benediction, his hands lifted up and his face raised heavenward. On each side of Our Saviour is a group of adoring angels, an effulgent and radiant light enveloping His person. Of course, we have the conventional cloud which separates the disciples and the darker hills of the earthly scene. The figures are luminously painted, Mr. Cave Thomas adopting the plan of making his lights strong, the shadows being, as it were, suffused and toned by them, and this treatment is necessary for the position the picture is to occupy. The composition of the figures is well balanced and the whole picture dignified, displaying a refined and idealised conception of the subject. GOTHE.

## CHIPS.

Mr. W. Howard Seth-Smith, President of the Society of Architects, has been appointed architect of the new Marling Grammar School at Stroud, Gloucestershire. The governors have secured a fine site, eight acres in extent, near the town.

The death is announced, at the age of 69 years, of Mr. William H. Baily, acting palaeontologist of the Geological Survey of Ireland. In 1844 he was attached by the late Sir Henry de la Beche to the Geological Survey of England, first as a draughtsman, and afterwards as assistant naturalist. In 1857 Mr. Baily was transferred to the Irish branch of the Geological Survey as palaeontologist, and this post he held until his death. He was also demonstrator in palaeontology to the Royal College of Science, Dublin.

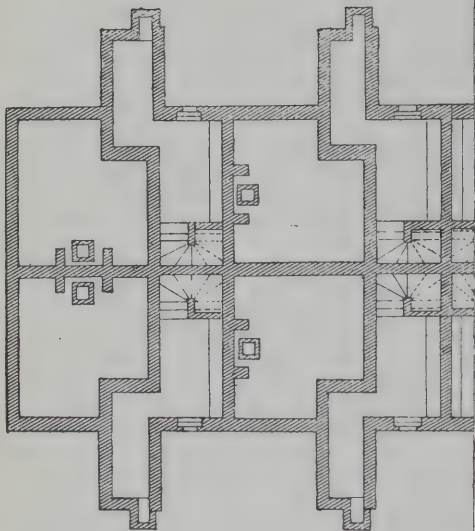
Preparations are being made to demolish a considerable amount of building property on the west side of Bishopsgate-street, to form the site of the enlargement of the Great Eastern Railway Company's Station at Liverpool-street, the cost of which is estimated at a million sterling. Meanwhile the company are about to widen their line between Liverpool-street and Bethnal-green Junction, to the extent of two additional lines of rails, this undertaking involving the construction of an underground line from Wheeler-street to Brick-lane, northwards of the existing line.

The following gentlemen have been selected from 150 candidates for the office of Borough Surveyor of Sheffield, for which the salary offered is £800 a year:—Mr. Joshua Cartwright, borough engineer of Bury; Mr. Thomas Longdin, borough surveyor of Warrington; Mr. R. S. Dagdale, borough surveyor of Huddersfield; Mr. J. T. Eays, borough engineer of West Bromwich; Mr. J. W. Brown, borough surveyor of West Hartlepool; and Mr. Charles F. Wike, assistant borough surveyor of Leicester. The highway committee will have an interview with the six surveyors named on Tuesday next.

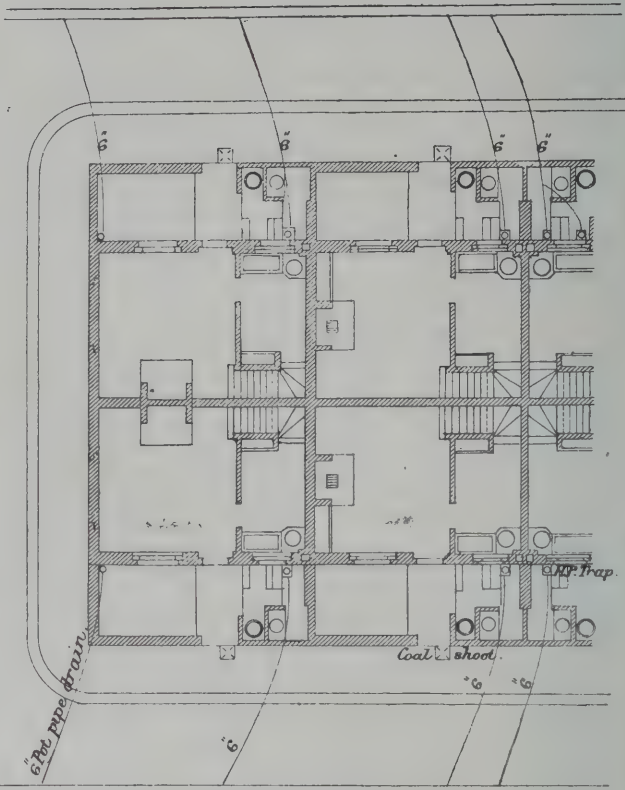
The Wolverhampton board of guardians have finally adopted plans by Mr. C. H. Stanger for the proposed eight cottage homes. The commission offered and accepted by Mr. Stanger is 5 per cent. on the first building, and 2½ per cent. on the remaining seven homes.



BACK-TO-BACK HOUSES  
HALIFAX.

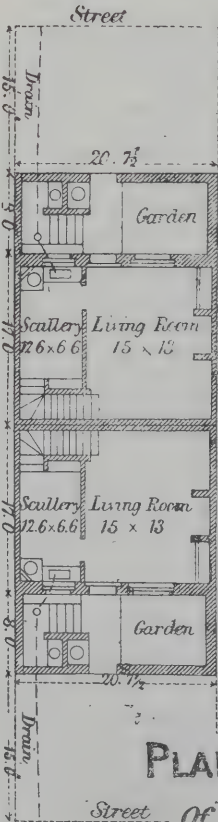


CELLAR PLAN.

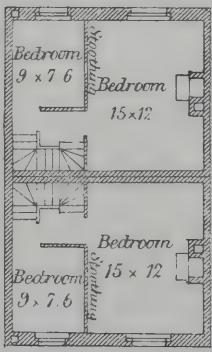


GROUND PLAN.

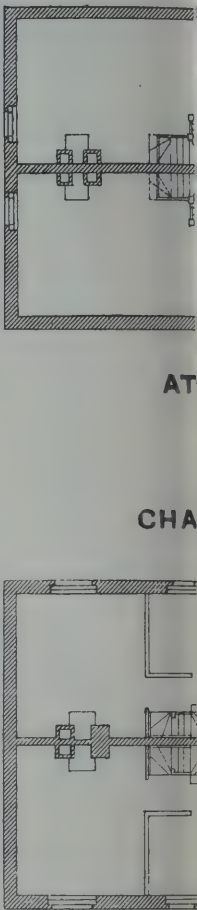
PORTION OF A BLOCK OF 16



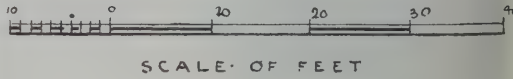
PLAN Z!  
FOR BACK TO BACK HOUSE.



CHAMBER PLAN.



PLAN Z  
FOR THROUGH

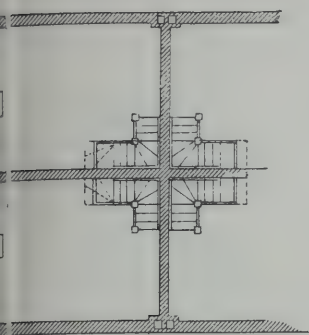


PLANS FOR "BACK-TO-BACK" AND "THROUGH" HOUSES

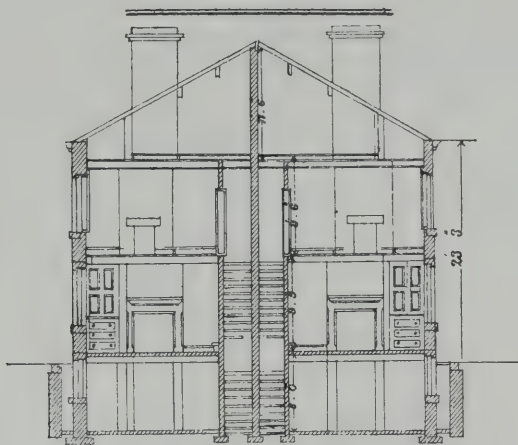
*Of approximately the same size prepared in accordance with the minimum requirements of the Byelaws and Regulations of the Halifax Urban Sanitary Authority.*



BLOCK OF 4 BACK-TO-BACK HOUSES.  
*Erected at KEIGHLEY.*

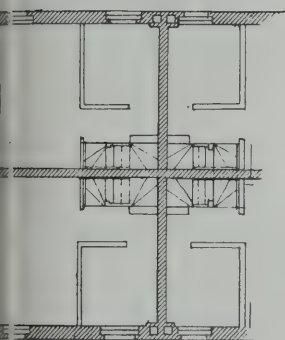


PLAN . PLAN A .



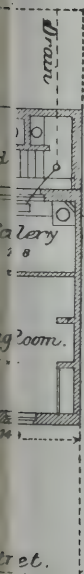
SECTION A . B .

PLAN .

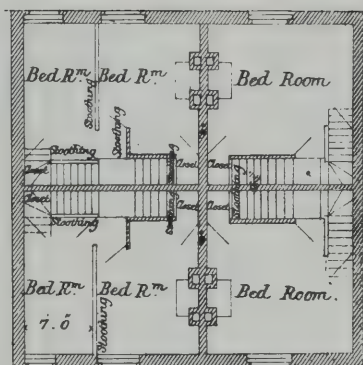


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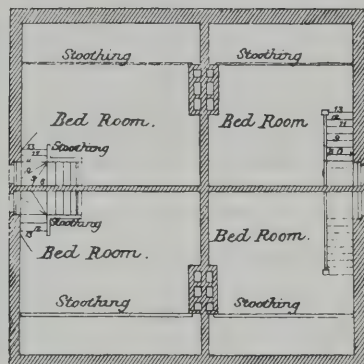
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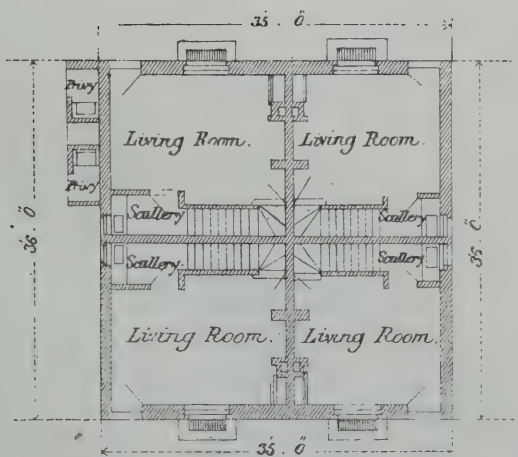
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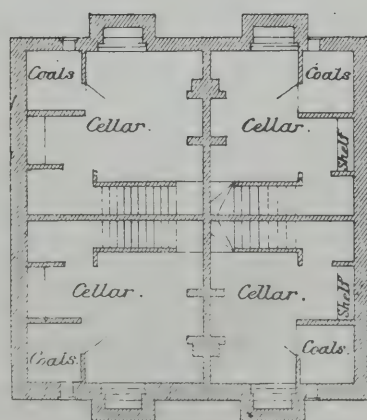
1<sup>ST</sup> FLOOR PLAN .



ATTIC PLAN .



GROUND FLOOR PLAN .



BASEMENT PLAN .



## BACK-TO-BACK HOUSES.

THE joint report by Dr. Barry and Mr. P. Gordon Smith on back-to-back houses, just issued by the Local Government Board, will be read with interest by all who have the sanitary welfare of our large manufacturing town population at heart. The report gives, in a concise and classified form, the information obtained as regards these dwellings in several towns, the number and proportion of "back-to-back" houses built recently in Halifax, Morley, Todmorden, Stainland, Keighley, Leeds, Bradford, and other towns in Yorkshire. It is not a very gratifying fact to be told that in many of these towns a very large percentage of the houses built during recent years are on this principle—certainly anything but reassuring of the progress made in sanitary building. Dr. Barry and Mr. P. Gordon Smith have sought for particulars under five different heads, as follows: (A) Extent to which back-to-back dwellings have been built during recent years; (B) Space about dwellings required by local regulations, and the amount actually provided in practice, together with the arrangements made for securing circulation of air about dwellings; (C) relative density of houses on area; (D) structural arrangements of buildings as to stability, prevention of fire, means of ventilation, disposal of excrement and refuse, and accommodation afforded in different classes of houses; (E) relative cost of houses, &c.; (F) influence of different classes of houses upon the health of inmates.

First, as to the proportion of back-to-back houses, the table given is convincing. To take Halifax, out of a total of 2,094 houses built from 1876—86 (11 years) no less than 1,287, or 61 per cent., were found to be on this plan, and with the exception of one year, the proportion of "back-to-back" houses was greater than that of "through" houses. In some years the percentages were very high, in 1879 as high as 83 per cent. of the total number built. In Morley the proportion is 82 per cent., and is steadily increasing; at Bradford, out of a total of 7,036 new houses certified as fit for habitation, 64 per cent. were built on the back-to-back plan, or during the 11 years (1876—86) new dwellings have been erected for over 20,000 persons unfurnished with means for thorough ventilation. At Leeds, in two years 1885—1887, out of 2,311 houses for all cases certified as fit for habitation, no less than 1,502, or 65 per cent., were on this plan. During the 12 years ended August 1887, 16,070 new houses of all classes have been certified as fit for habitation, and of these it is estimated that at least two-thirds, or 10,780 houses, have been built back to back, a number which, taking 4.7 persons to each house, would accommodate over 50,000 persons. Though at Dewsbury the by-laws allow the open space to be provided at the side of houses, permitting the erection of blocks of four back-to-back houses, no such houses have been built of late, and the council refused to pass plans which did not provide space in the rear. At Saville Town, Keighley, and other places back-to-back houses are limited.

As regards space about dwellings, the report deals with the local regulations in each district, and the manner they are carried out. The regulations as to open space at Halifax are that the width of a first-class street shall be 54ft. inclusive of footpaths; a second-class street shall be 40ft.; a third-class street 30ft., all to be carriage roads. Every new street not a carriage road is to be 20ft. wide at least, and there shall be one entrance at least the full width thereof. Another section of the Local Act regulates the height of buildings erected in existing streets, the height being limited to two stories, exclusive of cellars, in any street made or laid out after the passing of the Act of less width than 10 yards, and to three stories in any such street of less width than 12 yards. The report states that in actual practice the minimum width is allowed in streets inhabited by artisans. For securing light and air the following sections are in force:—(1) "It shall not be lawful for any person, without the previous consent of the corporation, to erect dwelling-houses in blocks so that any block shall contain more than eight dwelling-houses when built back to back, and four dwelling-houses not being through houses

when built in a single row." The second by-law states that an open space shall be left at the end of each block, and to remain free from any erection thereon above the ground except privies. The distance across such open space between every such block and the opposite property at the end or side shall not be less than 15ft. at all points, or every house shall have at the front or back an open space to the extent of 150 square feet. From these regulations, Dr. Barry and Mr. Gordon Smith observe: "It would appear that in a street where back-to-back houses were erected in blocks of eight on both sides of the street, and where the distance between the adjacent blocks was less than 15ft., it was intended that there should be a clear space of 60ft. between the opposite houses. (This regulation has never been put into force, the provision of 150sq.ft. of space in front, irrespective of the width across the space being accepted.) When, however, the houses are erected in rows consisting of more than eight houses, it would appear that the provision of only 150sq.ft. of open space to the front of each house is considered sufficient." The authors justly observe that the sanitary authority of Halifax have used very freely their discretionary powers. In one block, surrounded on three sides by streets 30ft. wide, there are 16 back-to-back houses, detailed plans of which we give in our plate, each house 17ft. deep, exclusive of garden and privies, and 20ft. 7½in. wide; in another portions of two blocks of 28 and 30; in a third a portion of one block of 40 back-to-back dwellings; and in a fourth, a portion of a block of 20 "single" houses without any openings for circulation of air. The amount of air space per house, exclusive of streets, are 172, 462, 4,712, and 168-sq.ft. respectively. These irregularities are instructive, and shows how unequally the provisions of the section are carried out. Our plans Z¹ exhibit the back-to-back type of house prepared in accordance with the minimum requirements of the by-laws and regulations of the Halifax Urban Authority; and Z², "through" houses of approximately the same size. As regulations limiting to eight back-to-back or four single houses are no longer in force in the town, the danger of stagnation of air in localities with long rows of such houses without cross streets is likely to occur.

At Morley the code of by-laws gives a minimum width of street of 36ft., and for streets not intended for carriage traffic of 24ft., when they are not more than 100ft. in length. The erection of back-to-back houses is limited to blocks of eight, the distance across the space in front of houses to be 36ft. at the least; the width of street may be included in this space, and a space of 12ft. is to be provided between the blocks, or of 6ft. between the blocks and other buildings of 6ft. in width at the least. The "through" houses built at Morley have a common yard at the back in spite of the by-law, which provides that the open space is to belong exclusively to each house. Another block plan given exhibits an estate of six blocks of back-to-back houses, with intervening spaces of 12ft., and 54ft. between opposite blocks. A third plan shows the extent of overcrowding of these houses when the space occupied by each house, including a due proportion of street, is only 78 square yards. At Todmorden the state of things is even worse, as there are no provisions with respect to width of new streets, nor as to open spaces about houses. In one case shown on plan, a block of ten back-to-back houses faces a street only 30ft. wide on one side, and the main sewer passes directly underneath them. The through houses are worse; a passage of 13ft. is in the rear of two parallel rows, one end stopped by a block of privies and ashpits common to all the houses. Stainland is equally bad: the "through" houses shown are without back streets in some cases, and the open space in rear is much below the area required by the Model By-laws, some of the back-to-back dwellings being huddled together between streets only 15ft. wide. It is pleasant to turn to Keighley. Here the regulations contained under the Waterworks and Improvement Act, 1872, provide for streets of 36ft. and 24ft. minimum width for the two classes of traffic; but the local authority, in exercising their discretionary powers, have increased rather than diminished the widths, and have made a recommendation to provide an open space of

200ft. at the least in front of dwelling-houses which do not face any street. The report states that these regulations only permit of the erection of four back-to-back houses in one block, and that the blocks must be separated by a space of at least 10ft.

We illustrate a block of back-to-back houses built in accordance with these rules. The authors of the report say "there can be no question that, putting on one side the subject of density on area, this method provides incomparably the best means for securing the thorough circulation of air about such houses." One of the omissions in the by-laws is pointed out—namely, that the provision of windows on each floor overlooking the open space at the ends of blocks is not made obligatory, thus sacrificing the advantage of the four-house arrangement. The relative areas occupied by buildings, by streets, and by yards and forecourts are given in a table of special value, to which we direct attention. In Halifax, where there are sixteen houses to the block, and the open spaces are in accordance with the minimum regulations, the density of houses varies from 46.5 up to 61.4 per acre, giving a density of population varying from 214 to 282 persons per acre. In those dwellings where the amount of open space exceeds the local requirements, the number of houses per acre is only 36.6 and 37.5, or a population of 168 and 172 persons per acre.

At Morley the density of houses per acre is 42, 57, and 62, giving a population respectively of 193, 262, and 285 per acre. Todmorden, where no regulations are in force, the density of the through houses is 55.2 and 69.1, and the population 253 and 317 persons per acre respectively. The back-to-back houses in one case show a density of 75.7 houses and 348 persons per acre. Keighley shows a density in the back-to-back houses of 58.9, or a population of 271 per acre. It may be of interest to note that while the density of the central districts of London is 107,729, some of these back-to-back houses show a rate of 182,400, and even 222,720 persons to a square mile; but the greater height of London houses must be also borne in mind. In another table the report gives the areas of land provided for open spaces as regards through houses. In the case of streets more space has been provided than is required by the model clauses; but as regards yard space, the amount provided is generally far below that required under the model clauses. An instructive diagram is given showing the number of back-to-back houses and through houses erected on an acre of land under the different regulations. In Halifax the blocks we illustrate give about 56 houses to the acre; at Keighley, plan Z¹, 59 houses back to back; plan Z², 48 houses to the acre. This diagram is worth study, and indicates that under the most desirable regulations a population of 184 to 207 to the acre is obtained, a crowding decidedly high, though the arrangement is according to the model code.

We cannot afford space to enter into the other sections of the report, such as structural arrangements; suffice to remark that in relation of the two arrangements of back-to-back and through houses to health, the latter have an advantage, as in a "through" house there are two party-walls and two external walls; but in the back-to-back plan each centre house has three party-walls and only one external wall. The walls also in this latter class are sometimes only 4½in. in thickness and not carried through the roof, the evils of which are apparent. As regards ventilation of these houses, local by-laws are not sufficient, and in many of the houses the upper rooms are lighted and ventilated by skylights alone. The report enters minutely into the several details of ventilation, disposal of refuse, amount of accommodation, as they are found in the several towns. As regards accommodation, the table shows that the "through" houses have a rather larger area of living and scullery and bedroom. As to relative cost, the authors, who have gone very elaborately into the matter (see Table V.), conclude that the difference between a "through" and back-to-back house, each of the same accommodation, and built equally well, is only £5 in favour of the latter type of dwelling, or about a penny per week less rent. The figures as to cost have been compiled from those furnished by the local surveyors. Of course the price of land is material, and has influenced the erection of the back-to-back house.



The report exhibits considerable labour and expensification, the results thrown into the scales are valuable, and ought to be studied by those interested in the question of housing the growing population. The conclusion to be drawn from the report is obvious. It is quite clear that the Local Government Board should withhold their permission to the erection of houses on the back-to-back principle, and should not sanction any by-laws that would allow so gross a violation of sanitary construction.

## Engineering Notes.

**THE RIBBLE NAVIGATION WORKS.**—Mr. B. Sykes, the engineer, has issued to members of the Preston Corporation his comments on the report and evidence of Mr. Abernethy, C.E., and the opinions of Mr. Giles, M.P., Mr. W. H. Meeler, Mr. James Deas, and Mr. John Fowler, engineers, who were called before the Select Committee on behalf of the Corporation. With regard to the opinion of Mr. Abernethy that the extra width of channel at Lytham is undesirable, Mr. Sykes shows that the extra width was suggested by Stephenson and Son in 1838, and that the line then laid down in the preliminary plan was precisely the same as that fixed by Sir John Coode in 1883, only the line is extended a half-mile further seaward. Mr. Sykes maintains that the design and works are of a great credit to the Corporation and all parties interested in them. Without fear of contradiction, they are, he says, the cheapest ever constructed in any part of the world. The workmanship has been good, and the works have been carried out within the estimate. It would have cost the Corporation £45,000 more to have carried out Mr. Abernethy's suggestion to line the front of the dock walls with ashlar. Mr. Sykes declares that the locks are perfectly safe and secure. Communications from Mr. Walker, contractor, and his proposals were laid before the Ribble Committee on two or three occasions. They were all considered, and it is thought undesirable to interfere with Mr. Walker's contract in any way. The town council have, by a narrow majority, since rejected the proposal of the Ribble Committee to have an interview with Mr. Abernethy with a view to adopting his report as the basis of a new Bill.

### CHIPS.

A massive cross of white Sicilian marble, standing 5ft. 8in. high, and discernible for miles around, has been erected upon Lliwedd ridge, one of the best spurs of Snowdon, as a memorial to Mr. Alfred Evans, the young Liverpool solicitor who was killed on Whit Monday when making the ascent of the mountain from the Capel-Curig side. Messrs. Roberts and Co., of Carnarvon, have executed the work.

Prince Albert Victor will visit Manchester on 20th prox. for the purpose of inaugurating the Oldham Lads' Club, Livesey-street, and laying the chief corner stone of the new buildings in connection with the Ancoats Hospital and Dispensary.

A stained-glass window has just been erected in Michael's Church, Helensburgh, in memory of William Ruddock. The window is the work of Messrs. Shrigley and Hunt, of Lancaster.

Count von Moltke witnessed on Saturday the unveiling of the Victory memorial at Leipsic. The monument, which has been designed by Professor Meunier, of Berlin, is the largest in Germany, with the exception of the monument to Frederick the Great and the Niederwald monument.

Renewed efforts are being made to raise funds to complete the restoration of Peterborough Cathedral. Canon Argles has promised a second subscription of £500, in addition to £1,200 given by the bishop for a throne and choir pulpit, and another £500 for other special portions of choir stalls. Lady Elizabeth Villiers has given £200 towards choir stalls. Collecting boxes placed in the Cathedral have realised £965.

On Wednesday week Colonel Ducat, one of the members of the Local Government Board, held an inquiry at Kippax into a proposal on the part of the Tadcaster Union Rural Sanitary Authority to construct a system of drainage for the village, and an outfall into the Sheffield Beck, at a cost of £2,200. Mr. M. Paterson, C.E., Bradford, is the engineer.

## Building Intelligence.

**GLASGOW.**—The Queen formally opened on Wednesday the new Municipal Buildings, erected from designs of Mr. William Young, of London and Glasgow, which, it will be remembered, were chosen in competition. The building is Italian Renaissance in character, and covers an area of 238ft. by 247ft., with an internal quadrangle 94ft. by 87ft., approached by carriage entrances. The structure is generally four stories in height above the level of the street, the altitude of the walls being 75ft.; but the angles are carried one flat higher, and are crowned with octagonal cupolas 125ft. high at the apex. In all the fronts the corners and centres are pronounced by being set forward to the building-line, and the intermediate parts are recessed some 8ft. The ground and first floors are treated throughout as a rusticated basement for the pile. The central tower is 50ft. square at base, and rises to a height of 240ft. It is faced with stone from Polmaise and Dunmore Quarries, backed by brickwork, the base and some of the internal columns being of Aberdeen granite from the quarries of Mr. Fyfe, the other internal polished granite work having been obtained from Shap. Messrs. Morrison and Mason are the contractors, and Mr. E. C. Morgan has acted as clerk of works. Mr. John Mossman, of Glasgow, has executed the carving from the architect's models, with the exception of the pediment in the chief façade, that to George-square, which represents the Queen receiving the homage of representatives of the British Empire, and has been executed by Mr. G. A. Lawson. The total cost has been £530,000. Mr. Young's designs were illustrated in the *BUILDING NEWS* for Sept. 15 and Nov. 10, 1882, and Jan. 16 and May 1, 1885, and two of the figures in spandrels in our issue of Sept. 16, 1887.

**WINDSOR CASTLE.**—St. George's Chapel, Windsor Castle, which has been closed for nearly a fortnight for cleaning and repairs, was reopened on Sunday morning for Divine service. A stained-glass window, adorned with the arms and titles of 12 Knights of the Garter, has just been placed on the north side of the nave. An interesting piece of ancient tapestry now adorns the wall of the south side of the reredos. The needlework was recently found in the library of the Dean and Chapter, and is said to have been originally presented by Lady Mordaunt to the chapel in the time of King Charles II. The subject is the Saviour supping with the two disciples at Emmaus after His resurrection, and the tapestry, according to Canon Dalton, is supposed to be a copy of a picture painted by Titian in 1520. If such is the case, the face of the Saviour is a portrait of the Emperor Charles V., uncle of Catharine of Arragon, who married Henry VIII., while the faces of the disciples seated at the table are likenesses of the Emperor's son, Philip II. of Spain, and Cardinal Ximenes, the Prime Minister of the latter Sovereign. The tapestry is hung opposite the projecting window of the Queen's closet. The cleaning has been executed by the chapel officials and workmen, under the supervision of Mr. Nutt, the clerk of the works to the Dean and Chapter.

At the half-yearly meeting of the Barry Docks and Railway Company held on Friday, the engineers' reports were presented, showing that the breakwaters, earthworks, and masonry of the docks and basin were nearly completed. The foundations of the coal tips on the north side were finished. The tunnel by St. Fagan's was nearly completed, that by Pontypridd completed and lined, and the junctions had been laid by the Taff Vale Railway. The hydraulic pumping engines were ready for erection, and without doubt the dock would be open next year.

The parish church of Countisbury, Devon, was reopened by the Bishop of Exeter after undergoing the first section of a restoration. For cramped and narrow pews, in which it was impossible to kneel, seats in pitch pine have been substituted. It was found necessary to provide an entirely new floor, as well as new panelling around the walls of the nave. The entrance porch has been widened, and a new door, lectern, and reading-desk provided. Messrs. Jones Brothers, of Lynton, were the builders.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the *BUILDING NEWS*, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX, XL, XLI, XLIV, XLV, XLVI, XLVII, XLVIII, XLIX, L, LI, LII, LIII, and LIV may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—L. S. B.—G. E. B.—H. and L.—C. Co.—B. and P.—B. B.—W. H. M.

## Correspondence.

### "PRIESTLEY AND ANOTHER v. STONE."

To the Editor of the *BUILDING NEWS*.

SIR,—In order to understand clearly the judgment of the Courts in this case, it is necessary to bear two facts in mind which, once clearly established, the judgment follows as a natural sequence. These facts are simple enough in themselves. They are (1) that the quantities are prepared for the benefit of the building owner, and (2) that he pays for them.

(1) The quantities are prepared for the owner for precisely the same reasons that the plans and specification are prepared for his benefit, and they are all means to the same end—namely, the building that is wanted. The builder uses the quantities; but the use he makes of them is of the same nature as the use he makes of the plan and specification, and it is as rational to contend that the one is for his benefit as to contend that they are all for his benefit, and it has never been asserted that the latter are prepared for him.

(2) The owner pays for the quantities, and the law recognises this so clearly that it authorises the architect to order them on his behalf without consulting him in the matter at all. Whether the surveyor receives his fees directly or indirectly matters not: the contractor may or may not be the conduit pipe; the money in all cases comes out of the owner's pocket. And, these facts being admitted, the decision follows, so to speak, as a matter of course, being based on a principle which underlies, it seems to me, both law and common sense, and that principle is this: that duty and liability are owing to those who employ us, and pay us for our work, and to those only. But it will be



urged, the contractor must be protected, or protect himself from the negligence of others. Undoubtedly he must, and to ask him to base his estimate upon certain quantities, and then exclude them from the contract, is neither fair nor reasonable, and in the conduct of business outside the building trade there is nothing analogous to such a practice. Unfortunately for the plaintiffs in this case, they entered into a contract which was condemned in open court, and in unmeasured language, by their own witnesses. These witnesses, as Mr. Justice Stephen observed, played the part of Balaam to the learned counsel who called them. Instead of cursing the enemy, they "rounded"—if I may use the expression—on their friends. I take the opportunity of protesting against a paragraph in your article (*BUILDING NEWS*, Aug. 17): "The plaintiffs soon found that the quantities were very deficient." Will you allow me to say that if the defence had been heard upon its merits, I should have brought a string of witnesses, including four Fellows of the R.I.B.A., to prove that the quantities prepared by me did not, and could not be made to, apply to the church as executed, in consequence of alterations made after they were taken out. I may also add, in passing, that I was sued for items which were omitted by the express instructions of the architect. It is quite true that there may have been original vices; on the other hand, there may have been excesses. There is nothing unreasonable in this assertion. There is the well-known case of "Scargill v. Shoppee and Young" in point. Here the defendants, after being threatened with an action for deficiencies, had to defend one brought against them for excessive quantities. Truly the mariner's course between Scylla and Charybdis was plain sailing compared with the quantity-surveyor's course in these days of competition. There is first the client who wants full value for his money and as much more as he can get; then comes the architect, the burden of whose song is something to this effect at starting: "The estimates come out very high; I feel certain your quantities are largely in excess." At completion: "Why in the world did you cut things so fine?" Lastly, there is the contractor, who watches the bills as the work proceeds with an Argus eye for the "short" quantities, and a blind eye for the "long,"—a blind eye which Nelson himself might have envied. The allegation as to negligence was made, and, of course, it may be true; but the paragraph quoted above is unfair, and in the face of the judgment unjust. Lord Justice Lindley—who heard all that special pleading could urge against the quantities, and hardly a word in their defence—concluded his judgment by saying, that in his opinion there was no evidence of want of reasonable care.

I turn with relief from a dry and dreary subject, as Mr. Meadows White justly called it, to something a little more entertaining. And that is the suggestion of your contemporary, that the quantities should be left entirely in the hands of the builder. In these days of keen competition and cutting prices, to allow him to order the quantities will be oil to his wounds and balm to his harassed soul. It is pleasant to picture the quantity surveyor of the future—a little obsequious, perhaps, but otherwise very cheerful and expectant—waiting at the builder's office for the purpose, let us say, of adjusting the final accounts. And what a happy adjustment!—no niggling over half-inches, no squabbling over the girth of this moulding or the projection of that cornice—no hair-splitting, in a word, about trifles. And what a "high" time for the surveyor as well! The miserable 1 or 1½ per cent. which at present constitutes the solatium for all his cares and troubles would expand into a good round five, or, under favourable conditions, even into double figures—for, of course, the building owner would have to pay. Under these circumstances the Modern Babylon would become a sort of builder's paradise, and a very deserving, if somewhat prosaic, class would be at once translated to realms happily not beyond the skies, nor even beyond the flight of Mr. Baldwin's parachute, but, at all events, where "bills" are unknown and pay-day has no terrors.—I am, &c., FRED. STONE.

SIR,—As sooner or later we ape your business habits at this side of the Channel, particularly they are worse than our own—just as the

ladies at your side adopt French fashions—we are also interested in the results likely to arise from the decision in the above case. Is not Mr. Arthur H. Spokes entirely astray as to "the practice at present adopted in the building trade" as to how builders get quantities? He assumes that the practice is that they get them from or through the architect, as in the above case, which I think quite exceptional in that respect and others, for not only were the quantities issued from the architect's office, but he does not appear to have denied that the specification was not written when the quantities were taken out, and that the drawings were altered after they were taken out, or, still worse, that he directed work to be omitted from the quantities that had to be executed under the contract. I know that the practice is not followed by us, and that it was not general at your side some time ago. And as it appears to me that the decision in the above case mainly turned upon it, I am anxious that it should not be overlooked. The, to the lay mind, rather foggy phrase, "No privity of contract," I suppose means that the parties not coming in contact there could be no understanding or agreement between them. But if the general practice is that the quantities are supplied direct to the builder by the surveyor, even when he is selected by the architect, surely there must then be privity of contract between the party who supplies them and is to be paid for them, and the party who receives them from him and is to pay him for them.

Indeed, it is densely foggy to the lay mind how there was sufficient privity of contract for the surveyor to enforce payment of his fees and not sufficient for the builder to recover for loss from errors in the quantities for which the fees were to be paid. However, if the fact of the quantities being supplied direct by the surveyor to the builder and payment for them would not establish privity of contract between them, builders should refuse to accept quantities unless there was added to the usual items at foot for surveyor's fees something to this effect—"To be paid by the employer if no tender is accepted, or by the builder whose tender is accepted out of the first instalment, and in consideration of which the correctness of the quantities is hereby guaranteed by me (or us), and my (or our) liability acknowledged for any loss from errors in them to the employer or builder."

Lawyers are, naturally, opposed to fixing responsibility on any professional man for the due discharge of the duties he undertakes and takes payment for. They so frequently fail to fulfil the duties for which they receive their fees, and they rarely, if ever, master the details of a complex building case.

You were quite right in saying that the method described of fixing responsibility by making the quantities part of the contract, so that the employer would be liable to the builder, the architect to the employer, and the surveyor to the architect, would be "round-about"; for indeed it would be the old game of sending the fool farther, and would not of itself in the slightest degree aid in improving privity of contract, while it would open the floodgates for fraud and jobbery for those who fish in foul waters, and it is quite easy otherwise to counteract the evil effects of the decision in "Priestley v. Gurney."—I am, &c., Limerick, August 18. M. M.

#### STRAINS.

SIR,—With reference to Col. Seddon's letter reflecting upon Mr. Middleton's theory of the shearing stress in the centre of a uniformly loaded girder, it is a serious matter for students to be misled, as they have to answer such questions at Civil Service competitions, and the loss of a few marks means—a place.

I have never seen so strange a theory advanced before, and I am sure there are many like myself who would feel indebted were some recognised authority to set the matter at rest.—I am, &c., S. H. G.

SIR,—Mr. Middleton, in a footnote to his last article, in your issue of the 17th inst., still maintains his theory with respect to the shearing stresses in the centre of a beam supported at both ends, and loaded at more than one point. Will he kindly prove what he states—viz.:—That the first load which is met by one

of the reactions only diminishes that reaction by the portion due to that load. The statement in his answer the same week to Col. Seddon, that effects must travel to their causes, is merely an assertion, and no proof. It would also be interesting to know who first discovered this.

I must apologise for again troubling you on this subject, but it is necessary that this new theory should be proved before it can be accepted as a fact.—I am, &c.,

FRED. G. EDWARDS,  
120, Leighton-road, Kentish Town, N.W.,  
Aug. 18.

[Col. Seddon also sends a reply to Mr. Middleton's letter, which cannot appear till next week, as there is not time to engrave the necessary diagrams. Mr. Middleton had better postpone any further reply till Col. Seddon's letter has appeared.—Ed. B.N.]

#### WANTED, A PROTESTANT CONTRACTOR.

SIR,—I inclose an advertisement from the *General Advertiser* of last Saturday, which is rather behind the times:—

TO PROTESTANT CONTRACTORS.  
TENDERS will be received up to Twelve noon on TUESDAY, 28th inst., for the  
**REPAIRING OF THE CHURCH TOWER**  
at CARNREW. Particulars on application to the undersigned.  
N.B.—The lowest or any tender not necessarily accepted.  
CHARLES SYMES, Sec.

About 20 years ago it was no uncommon thing to see the notice that "No Papists need apply," but the parties having charge of the repairing of the church tower at Carnrew are determined that it shall be in the hands of an orthodox builder; but, hold!—they do not mention the exact form of Protestant. In order to make the matter complete, they should advertise for a contractor with Evangelical views, who only employs Evangelical workmen. Then they might rest content that the repairs of their tower were in good hands.—I am, &c., Dublin, Aug. 22. J. L. R.

#### BARFRETON CHURCH AND CHURCH RESTORATION.

SIR,—There is a more interesting connection between the letters on these subjects than might at first appear; and there is no doubt that we all agree with "M." in his anxiety about a church for which we must all have so great an admiration. This anxiety is, that nothing should be done beyond what is really structurally necessary to preserve it, with a due regard to arrangements for the proper and dignified performance of divine worship. These conditions will, I confidently trust, be observed when the works of repairs are one day carried out under the architect, Mr. J. P. Seddon. I have referred in my "essay" to the desirability on some occasions of our mutually helping each other when any difficulties might arise in our work, and I instanced the case of Gerona Cathedral, where the "Junta" (not "Penta") of architects, twelve in number, consulted with and advised the architects of the intended new nave. It will, therefore, be of interest to "M." or perhaps to others, to hear that a "Junta" of architects, in the shape of the R.I.B.A. Arts Committee, have recently discussed, by his special desire, with Mr. Seddon, the sketch plans which he had prepared for Barfreton church. There were, of course, some differences of opinion in points of detail in Conduit-street, as there were at Gerona; but all were agreed on such essential matters as the preservation intact of the very ancient western wall, the old roof, and other architectural features, with only such reparation as should be clearly necessary. I may add that, as far as we know, no scheme of opening the arched recesses was contemplated, and your correspondent must, on this point, be mistaken. In the end, we all agreed with Mr. Seddon's cordial expression of opinion that it would often be very advantageous if some such similar consultation with professional brothers were held in other cases, where any difficult questions might have arisen in a church architect's practice.

The R.I.B.A. "Arts Junta" will, we need hardly say, most cordially give any assistance in their power to carry out the objects aimed at in the now re-issued "Suggestions and Hints on Church Restoration."—I am, &c., R. HERBERT CARPENTER.  
4, Carlton Chambers, 4, Regent-street, S.W.



ARCHITECTURAL PLAGIARISM.

SIR,—There is much to be considered in Mr. Hall's letter in your issue of the 17th inst. on the subject of "The appropriation of the ideas of others"; but, on the one hand, why do architects and students take the trouble to journey to the Continent and sketch the picturesque buildings and so carefully measure their details? Do they as carefully abstain from introducing any selections therefrom into a proposed town hall, church, hotel, &c., for which they have a commission? Do they ever fix the words, "with selections from the Hotel de Ville, Notre Dame, or any other building?" Did St. Peter's at Rome afford any aid to Sir Christopher Wren when he designed that noble edifice St. Paul's? Do any of our modern buildings in London resemble those on the Continent?

An architect goes abroad in order that he may improve himself by the selection and study of those buildings which he most admires, and which have been upheld by the profession at large. When he returns to his office, are these drawings of any service to him? and is any reference made to the names of the architects of the buildings which have been so carefully drawn? During a period of over 20 years' private practice, I have only heard of very few instances.

Again, when a building is handed over to public or private use, any person is at liberty to use his sketch-book and 24 inch gauge thereon, if he can get permission; and, after all, I do not perceive the difference between using it in England and on the Continent.

As regards "piracy of ideas," it is difficult to draw the line—as to a greater or lesser degree. If a bay of a public building like that of those mentioned by Mr. Hall was actually produced elsewhere, "piracy" would be a mild term for it. Perhaps "copyright" could be brought to bear, if the design were registered.

It is very hard on the author of a noble building when he has spent so much time and money on its production if any material points therein have been uncereemoniously abstracted and transferred to another man's work.

As the *locus in quo* of the building in question has not been made known, it is impossible to form an opinion of it. Doubtless some other professional will have a few words to say, which I shall look for with interest next week.

France.—I am, &c.,

H. T. PERCIVAL,  
Architect and Engineering Surveyor.

TEST OF A PASSENGER LIFT.

SIR,—This test had reference to the safety of one of our Reliance Suspended Lifts. To make clear its significance it is necessary to refer to the frequent failure of so-called "safety gears" when unexpectedly called upon under working conditions, even though such gears have satisfactorily passed a form of test at the time of erection.

The explanation of the discrepancy between the behaviour under test and under working conditions may be found in the nature of the test applied. The usual course is to suspend the cage by means of a short piece of temporary rope, which is cut through close to the top of the cage, the grip gear being previously well oiled, and everything ascertained to be in working order. These are conditions under which almost all safety gears would act; but conditions which never exist in practice, and hence the disappointing result.

When a rope or chain breaks in actual work it is because it is worn out, and the point of fracture will be that of greatest wear, but will never be close to the cage. In the case of a hydraulic lift with multiplying cylinder, this point will be found somewhere among the wheels of the cylinder. In the case of a lift driven by winding gear, it will be found in that part of the rope passing over the drum or wheel.

In all cases the fracture will occur at some distance from the cage, with the loose ends entangled among the machinery, and probably the heavy weight of loose rope or chain hanging from the off side of the overhead wheel, jamming the safety gear out of action. Before the safety gear can act it must pull the loose ends through the machinery, sometimes over or under six or seven wheels, and lift up the dead

weight of rope referred to. If not sufficiently powerful for this duty, it will allow the cage to fall, restrained only by the back drag of the rope which is preventing the action of the grips. This explains a peculiarity attending many lift accidents—viz., that though the cage has descended from a considerable height, the speed attained does not approximate to that due to free fall. We know of one case in which a man fell 60ft. in a lift cage, and was walking about within a week apparently uninjured.

The ordinary safety gear has the additional defect of being normally held fast in one position, and at the critical moment may be found to be set fast.

Passing now to the special test under notice, it is only necessary to premise that the "Reliance" gear is designed to act upon the failure of any one of the lifting ropes; that it has for its motive power the weight of the cage and load, so that the greater the load the greater is the effectiveness; and that it is actuated by the opposing pull of two ropes in a series; that is to say, should a given rope break, the safety action depends upon the tension of one particular rope among the survivors, each rope having its own proper opponent. It follows that should any pair of ropes be relieved of tension by the tightening of the remaining ropes, and that then one of the slack ropes should be fractured, its complementary slack rope would be in the worst conceivable condition for actuating the grips.

The lift tested was worked by a hydraulic multiplying cylinder, fixed at the bottom of the building. The rise of cage was 88ft., the load lifted 11cwt., and the weight of cage 10cwt.

The safety-gear had remained without special attention for nearly two years; it was taken just as found, and not even oiled. A pair of ropes was purposely slackened as above described, on the assumption that a careless attendant might make such a mistake. The cage was taken to the top of the building and left empty—i.e., with the smallest motive power for the grips. The point of greatest wear in the rope was calculated and checked by observation, and found to be 150ft. away from the cage end, having five wheels between it and the cage. Of the 150ft. of rope 100ft. hung vertically, representing a weight of 50lb. pulling against the gear. Under this accumulation of adverse conditions, one of the slack ropes was then cut through, 150ft. away from the cage, with the result that the safety-gear went into action, preventing the descent of the cage when the valve was reversed for lowering. The cut rope was then replaced by a new one, and all the ropes were adjusted to equal tensions. The cage was again taken to the top of the well, and loaded with 5cwt. of iron representing an average load of passengers. These conditions were a nearer approximation to those of ordinary working, and altogether more favourable to the safety apparatus. A second rope was then cut at a similar point measured 150ft. from cage, resulting, as was expected, in an even sharper and more decisive locking of the gear than in the first experiment.

A duplicate set of gear was tested with a ton of iron in the cage, with equally satisfactory results.

As already intimated, the ropes had done nearly two years of incessant work. A piece was cut out of the worst part of one of them and sent to Mr. Kirkaldy to test to destruction. Appended is a copy of his certificate.—We are, &c.,

ARCHD. SMITH AND STEVENS.

"Results of experiments to ascertain the tensile strength of one piece of steel wire rope, with fastenings, received from Messrs. Archibald Smith and Stevens:—

Test No.	Circumference in inches.	Hemp Core.	Ultimate Strength.		Position of Fracture.
			lbs.	tons.	
W 1318	1 90	Main & Strands	15,495	6·92	Two strands broke together, others separately. All clear of fastenings.

"The rope having been in use, and having broken wires, the extension was consequently not taken.  
(Signed) "DAVID KIRKALDY AND SON,  
"99, Southwark-street, London, S.E."

Intercommunication.  
QUESTIONS.

[9723].—Portland Cement Slabs.—We should be very obliged if you would ask the following questions in your Intercommunication Column:—What is the largest size to which a slab can be made in Portland cement or concrete carefully manipulated, without danger of cracking? Would it be safe to make a slab in cement or concrete 6ft. x 3ft. x 6in., so that it might be guaranteed against cracking in the course of time or in transport?—W. J. BENNETT.

[9724].—Quantities.—In last week's part of the excellent series of articles now publishing on this subject I note that the joists of all the floors above the basement are provided "notched" on to wall plates. Is this necessary, and does it serve any useful purpose? They are taken in the quantities as "framed." Is this right to take merely notched joists as framed?—B.

[9725].—Malt Kiln.—It is intended to lath-and-plaster the roof of a malt-drying kiln. Can any of your readers give me the best way of doing same to prevent the heat drawing off the plastering when drying malt?—SUBSCRIBER.

[9726].—Filtering Bed.—Will any of your readers inform me the best way to make a filtering bed in one compartment of a galvanised tank holding 200 gallons divided in the centre? The tank will be buried under ground, and the filtered water conveyed by its own gravitation to a dwelling house 100 yards away.—B. C.

REPLIES.

[9700].—Quality of Woodwork.—Having had more than fifty years' experience in the use of the various kinds of timber imported, I can only partially agree with the writer in last week's "B.N." on this subject. I find the quality of timber and deals now used in building much inferior to that formerly employed, the reason being simply its cheapness to the builder without a corresponding benefit to the employer. The best timber for carpentry is Memel, of which there are several qualities—crown, first, second, and third; and for joinery, Petersburg deals, of several qualities, selected according to the proportion of sap and knots. Also, for internal woodwork, Gelfe deals are very satisfactory. The timber now in use is much inferior to the above. Pitch-pine for carpentry is not of equal strength with Memel, is not so durable, and is very inflammable. Swedish timber is of less strength, and if exposed to weather, of short duration. The general run of Swedish deals, if used in small scantlings for carpentry, is very deficient in stamina, and in some situations quickly decays. In framing of doors and suchlike work, it will not retain its shape, but twists to a serious extent; and further, it is very productive of dry-rot, as witness the number of inquiries on this subject in your paper. Of all abominations there are none greater than the foreign-sawn boards, more especially floor-boards, which are the veriest rubbish. The best deals in use in my early recollection were Archangel. I have seen them placed in the most trying situations, and after fifty years they are perfectly sound. This article is not in the market now, but a spurious substitute has been sold under that name. If good and durable work is required, Memel timber and Petersburg deals will give a satisfactory result, even with a moderate amount of sap and knots.—DURABILITY.

CHIPS.

The parish church of Tattenhill, near Burton-on-Trent, is about to be restored, from plans by Messrs. Bodley and Garner.

A receiving order has been granted in the case of Walter Graves, Winchester House, Old Broad-street, E.C., architect and surveyor.

The foundation-stone of schools to be erected in connection with St. Alphonsus Roman Catholic Mission, Great Mersey-street, Liverpool, was laid on Friday by the Bishop, the Right Rev. Dr. O'Reilly. The available land is of so limited an area that to provide the required amount of accommodation for 800 school children it has been found necessary to erect a building three stories high, the basement being partly sunk below the street, and constructed to form a playground. The cost will be about £3,000. The architects are Messrs. J. and B. Sinnott, of Liverpool.

The Spanish Government has ordered its engineers to report on the condition of the cathedrals at Burgos, Barcelona, Leon, and Santiago, which are in an unsatisfactory state, until Parliament can vote in the autumn session the supplies necessary for the repairs of the cathedrals. Subscriptions are fast coming in for Seville Cathedral, which will require £30,000 and several years to rebuild the part of the nave which recently fell in. The ruins are being cleared away.

A new Congregational Church has just been built at Newquay, Cornwall, from plans and designs by Mr. Silvanus Trevail, M.S.A., of Truro.

The foundation stone of a mission church was laid at Wootton, near Almeley, Herefordshire, on Monday week. The building will be of stone, and will measure 36ft. long by 18ft. The roof will be ceiled, and covered with Broseley tiles. The cost is £220, and the builder is Mr. B. A. Hamer, of Kington.

The church of St. Alkmound, Shrewsbury, has been reopened after decoration in colour of the chancel, by Mr. J. Robinson, of that town.



### WATER SUPPLY AND SANITARY MATTERS.

**CAPE TOWN SEWERAGE.**—The authorities of Cape Town, as is well known, have had considerable difficulty in connection with the sewage and sewage disposal works for that city, and, although the cost must be of enormous magnitude, nothing yet appears to have been definitely done to remove the difficulties consequent upon such a state of things as at present exists. After considering numerous proposals to deal with the sewage, the municipality of Cape Town have finally retained the services of Mr. Edward Pritchard, M.Inst.C.E., of London and Birmingham, who has gone to the Cape to make a personal inspection of the district, and prepare a comprehensive report thereon.

**SEWAGE DISPOSAL IN FORFAR.**—We have received a brief account of the sewage disposal of this town, written by Dr. William F. Murray, F.R.C.S., Medical Officer of Health, from which we gather that the scheme has been eminently successful, the plan carried out being disposal by filtration through land. Forfar has a population of 15,000 inhabitants, and, being in a basin in the valley of Strathmore, has presented great difficulty in the disposal of its sewage. Mr. Willet, C.E., Aberdeen, was engaged to report on the available outlets for sewage, and to carry out a system of sewerage. For this purpose Messrs. Bailey Denton and Co., of London, were called on to advise, and the intermittent filtration principle of those gentlemen was adopted. Mr. Willet found that pumping was necessary, and a small estate of 40 acres was purchased. Here the sewage falls into two screening tanks communicating with a well, from which the sewage is pumped. The outfall sewer, two feet in diameter, is capable of delivering 2,000,000 gallons of sewage per diem. It has overflow weirs to relieve the pressure during heavy rain storms. The sewage is lifted 50ft., and when it arrives at the top of the bank Mr. Bailey Denton's scheme is carried out. The land at Forfar which receives the sewage is sandy and gravelly, and is limited to 24 acres out of the 40 acres. Upon this land the intermittent downward filtration, combined with surface irrigation, has been tried with marked success. There are seven acres devoted to intermittent filtration, and 17 acres left for wide irrigation. The loch belonging to the Earl of Strathmore was, before the present scheme was tried, polluted by sewage and the refuse of bleach works. To avoid super-saturation of the land, a main under-drain, with branches, is laid, which keeps down the subsoil water and secures the essential condition of porosity, so that the liquid can percolate. The filtration areas are laid out in a series of terraces, each perfectly level, intersected by main furrows and branch furrows cut at right angles, the former being cut deeper than the branch furrows, so as to allow the solid floating matter to deposit in them. Between the furrows the ground is planted with vegetables. The filtration areas and the delivery of the sewage to them are arranged so that each terrace can receive its quantum of sewage separately from the rest, according to the quantity of liquid to be disposed of. By this means the intermittent application of sewage and the consequent oration of the soil are maintained. From the figures we have received the financial success of the scheme is beyond doubt. From 15th of May, 1887, to May, 1888, the gross income from farm, including rent of house, is £432 19s. 11d. The expenditure, including rental of 40 acres at £1 10s. per acre and interest on £1,500, amounts to £350 6s., leaving a surplus of £82 14s. 10d. Equally satisfactory are the figures given of death rate. For the last two years the rate has been exceedingly low: 14·2 and 15·4 per 1,000 respectively. The analysis of Dr. A. P. Aitken, Chemist to the Highland Society of Scotland, is very satisfactory. The doctor observes, in a letter to Dr. Murray, "I regard the above results as a remarkable example of the excellence of intermittent downward filtration method, when carried out under favourable conditions," and adds he has seen no place where the sewage disposal is so well settled as at Forfar; and recommends corporations who have the sewage difficulty to face to inspect the works.

**WATER OF LEITH DRAINAGE SCHEME.**—The Edinburgh Town Council have received a report by Messrs. D. and T. Stevenson, C.E., regarding the new intercepting sewer for the Water of Leith Drainage District, proposed by the burgh engineers. The distinguishing feature of the scheme is that the Water of Leith is divided into two portions; the smaller and lower portion is to be accommodated by the existing sewer, while for the larger and higher portion a new main sewer is to be constructed. Messrs. Stevenson consider that the proposed drain is of ample dimensions throughout Edinburgh for the present and prospective wants of its own district within the municipal boundary; but a portion of the drain at the Leith end requires to be enlarged and other minor alterations made. Their estimate for works alone, in the absence of working drawings, irrespective of enlargement, amounts to £61,600.

### Our Office Table.

A PROTEST is made in the columns of the *Times* against the proposal of the Exhibition Commissioners to destroy, *more suo*, the amenities of the Albert Hall by removing the arcade, flight of steps, and conservatory on the south side to make room for two blocks of residences in flats. It is suggested that, even if the conservatory must go, the arcade, with its excellent terracotta ornamentation, and the steps might be retained, and, at the least, the proposed flats to be erected on the site of the quadrant terraces might be brought forward so as to give a *minimum* space at least equal to the conservatory between their backs and the Albert Hall. If the present plans be carried out, the "architectural merits" of the Albert Hall will be permanently impaired by crowding against its south side a series of incongruous domestic buildings. The Commissioners will, however, we anticipate, as recklessly destroy the architectural properties of the Prince Consort's memorial as they have sacrificed the horticultural gardens and the seat-holders' interests in the hall itself to their desire for gain. When a Royal Commission inquires into the doings of the South Kensington authorities, some piquant revelations may be anticipated.

SIR J. C. ROBINSON claims, and with considerable reason, that the result of the recent scientific investigation and experiments at South Kensington into the effect of light on water-colours has been to confirm his contention that many colours used in such drawings fade when exposed to sunlight. The novel and important point brought out in the inquiry is, as he shows, that all pigments are alike stable in a vacuum, thus indicating the real cause of the bleaching process produced by daylight—the action of the oxygen contained in the air, an action which, broadly speaking, goes on in the light only, being inoperative in darkness. If the commissioners are right, the simplest mechanical contrivances may hereafter insure eternal durability to water-colour paintings, and no time should be lost in verifying the efficacy or the contrary of the remedy. If the entire exclusion of atmospheric air should prove to be the sole condition for securing exemption from fading, surely it ought to be a simple matter to practically preserve drawings in a vacuum under glass. It would be a mere question of secure framing; possibly merely placing the drawing betwixt two sheets of glass in close contact with them under pressure, the edges of the glass being then hermetically sealed, might suffice.

MR. WILLIAM EASSIE, F.L.S., F.G.S., well-known as a sanitary engineer and an advocate of cremation, died on the 16th inst. at his residence in South Hampstead, aged 56 years. Fourteen years since, in conjunction with Sir Henry Thompson, he founded the Cremation Society, and he has since acted as its honorary secretary and the editor of its *Transactions*. In early life he entered the engineering profession, and was engaged as assistant to the late Sir I. K. Brunel. Along with the late Dr. Edmond Parkes, he superintended the sanitary arrangements of Renkioi Hospital during the Crimean War. At the conclusion of hostilities he took a band of navvies and made the first excavations on the site of old Troy. In 1872 he published "Healthy Houses," and subsequently a work on "Sanitary Arrangements for Dwellings." Mr. Eassie took an active part in the establishment of the Sanitary Institute of Great Britain; he was a member of its council and of its examination board until his decease, and frequently read papers before that and other similar societies.

ELIZABETHAN and Queen Anne architects would do well to include in their summer tour a visit to the collection of the late Mr. Thomas Lidstone, diocesan surveyor, made by him during the demolition of the ancient streets of Dartmouth, and in his long and varied experience in that neighbourhood in both Church and domestic architecture, and which is now on view at the Gymnasium, Dartmouth, a building 55ft. by 27ft., which it fairly fills, under the supervision of Mr. J. Parnell Lidstone and Mr. Robert Cranford, the Library, Dartmouth, from whom tickets to view can be

obtained. Permits to sketch can also be obtained.

MR. JOHN M'LEAN, architect, of Stirling died on Monday night in last week, at the age of fifty years. Originally a mason, Mr. M'Lean had the charge, under the late Mr. Rocheac architect, of the construction of the National Wallace Monument on the Abbey Craig, a work which he satisfactorily completed. He was afterwards appointed Master of Works for the burgh, and in this capacity he designed and partly carried out the feuing of the hospital lands, the drainage and blocking of the streets and other improvements. Latterly he devoted his whole attention to his work as an architect. His works include the Stirling Arcade and Town Hall, Coathill House, and many other buildings, public and private, in the town and surrounding district. Mr. M'Lean leaves a widow and grown-up family.

SAYS the *Newcastle Daily Chronicle*: "A considerable portion of the population of these islands has long suspected archaeology and its vicarities of having a family connection with humbug. At Warwick the learned members seem to have behaved like a parcel of school boys. The Warwick Natural History Society had secured an old vase unearthed during the excavations for the Suez Canal, and the president very kindly postponed the opening of it until the arrival of the Royal Archaeological Institute and its friends. One would think that such a ceremony, conducted under such auspices, would be extremely solemn. Nothing of the kind. The savans gathered round and apparently, banded jests with each other as to its date and nationality. Some said it was Greek, some Etruscan, others Egyptian; while the dates given disclosed, it is said, the trifling discrepancy of a 'thousand or two years.' The best joke, however, was on the subject of the vase's contents. A party, giddier than the rest, suggested 'Nile mud or Egyptian sand,' and drew a fancy sketch of the vase slipping off a peasant woman's shoulder in the interval of 'some episode of courtship,' and being thus forgotten. The vase really contained calceolar bones, which discovery no doubt sobered the venerable excursionists. One little item remains to be noted, however, and perhaps accounts for the unwonted jocularity: *the incident occurred after lunch.*"

MESSRS. WM. WOOLLAMS AND CO., manufacturing paperstainers, of 110, High-street, near Manchester-square, London, W., the original makers of guaranteed non-arsenical wall-papers, invite attention to their stand, D 219 and E 241, at the Irish Exhibition. Wm Woollams and Co. show, in the fixed specimens the designs of an Irish artist, Mr. A. F. Brophy of Limerick. The principal work exhibited is a dado decoration, in Adam's style, called the "Savoy." It is printed in terracotta, No. 2927 facing Avenue D; and in blue, No. 4104, facing Avenue E. On either side of the Avenue I front of their stand, is another dado decoration, Venetian in type, named the "Goldsmith," which is worked in blues, No. S 445, and in yellows, No. S 446; while the sides of the stand in Avenue E are occupied by eighteen different colourings of an all-over well-balanced damask pattern called the "Redcliffe," amongst which No. G 993, in yellows, and No. S 383, in blues are particularly successful. Mr. Brophy, now head master of the Art Department of the Finsbury Technical College, connected with the City and Guilds' of London Institute, was a student of the Limerick School of Art, and gained the only national medal awarded in art to Limerick in 1860. Subsequently in London he gained the gold medal for furniture and the architectural gold medal, and he is one of the examiners of national competition and third grade certificate work at the Science and Art Department, South Kensington Museum.

MR. T. W. HELLIWELL, of 5, Westminster chambers, has issued a catalogue of his well-known system of imperishable glazing without putty, which is now so extensively used in this country and America. The principal railway, the Government, and various public bodies are regular users of this system, which has also found favour among all owners of horticultural buildings. The catalogue contains some useful particulars of Mr. Helliwell's system of zinc roofing, in which no solder is used, nor any holes needful, and of a new trapless wash-out closet, called the "Perfection," which has many advantages.



Warren, G	...	...	...	...	399	0	0
	All of Hitchin.						



**HORNSEY.**—For stabling and cart-sheds, for the Hornsey Local Board. Mr. T. de Courcy Meade, engineer and surveyor:—

	A.	B.	C.	D.
Wall, C. Chelsea—				
£988	£602	£125	£170	
Wilmott and Son, Hitchin—				
987	550	122	157	
Dixon, J. W., Highgate—				
973	570	154	175	
Kerry, E., Highgate—				
925	552	131	163	
Mattock, Finsbury Park—				
895	505	111	145	
Stimpson, Kensington—				
840	540	97	132	
Rudd and Son, Grantham (accepted)—				
770	453	109	136	

**KENLEY, SURREY.**—For the erection of a new residence, for Mr. R. Martyr. Mr. H. A. Whitburn, Woking, architect:—

Marriage, Croydon ...	£1,010	0	0
Monger, Kenley ...	998	0	0
Holt, Croydon ...	875	0	0
Ward, Warringtonham ...	815	0	0
Hunt and Bryant, Kenley ...	800	0	0

**KENSINGTON.**—For the erection of a studio at No. 9, Sussex-villas, for Mrs. Blakiston. Mr. C. R. Guy Hall, A.R.I.B.A., 12, Lower Phillimore-place, Kensington, architect:—

Larner and Glanville, Kensington (accepted) £200 0 0  
(No competition.)

**KENSINGTON.**—For alterations to new business premises, new stabling, &c. No. 60, High-street, Kensington, for Mr. R. P. Evans. Mr. J. W. Stevens, No. 21, New Bridge-street, E.C., architect and surveyor:—

Peppiatt, J. T., Hoxton ...	£1,049	0	0
Prestige and Co., Pimlico ...	928	0	0
Leslie and Co., Kensington ...	903	0	0

\* Accepted.

**KETTERING.**—For metallising, paving, and asphaltizing Alfred-street, for the local board:—

Barlow, F. ...	£297	10	0
Henson, C. and F. ...	294	11	0
Barlow, A. ...	292	5	0
Henson, G. V. (accepted) ...	290	0	0

**LEICESTER.**—For the erection of two houses, Victoria-road, Leicester. Mr. W. Millican, architect:—

Black, H., Barrow-on-Soar ...	£2,900	0	0
Hallam, J. I. ...	2,899	18	0
Herbert, T. and H. ...	2,894	0	0
Bland, H. ...	2,763	0	0
Tyers, T. C. ...	2,765	0	0
Jewsbury, J. O. ...	2,700	0	0
Clark and Garrett ...	2,639	0	0
Elliott, N. ...	2,590	0	0

Rest of Leicester.

**LEAMINGTON.**—For work to be executed at the fire-engine station, for the town council:—

Houghton, Court-street ...	£92	0	0
Duke, Leamington ...	82	15	0
Glover, Warwick ...	75	5	0
Bowen, R. ...	74	0	0
Jenkins and Son ...	71	11	6
Hatherly Bros., Coventry ...	69	0	0
Smith, Milverton (accepted) ...	67	0	0

**LEAMINGTON.**—For the construction of a filter for the new swimming bath, for the town council:—

Jenkins and Son ...	£534	8	3
Bowen ...	479	18	0
Houghton ...	470	0	0
Hatherly Bros. ...	431	0	0
Smith, G. (accepted) ...	426	0	0

**LYDIARD MILLCENT.**—For alterations, &c., to the Butcher's Arms, Lydiard, Wilts. Mr. W. Drew, M.S.A., 22, Victoria-street, Swindon, architect:—

Ponting, J., Kingsdown (accepted).

**LONDON, W.**—For alterations, &c., required to be done to the Duke of Abercorn, High-street, Kensington, for Mr. S. Raven. Mr. H. I. Newton, 17, Queen Anne's-gate, Westminster, S.W., architect:—

Kirk and Randall, Woolwich ...	£1,516	0	0
Jackson and Todd, Hackney ...	1,328	0	0
Godden, S., Bryanston-square ...	1,313	0	0
Lamble, S. R., Kentish Town ...	1,289	0	0
Haylock, T., Pimlico ...	1,254	0	0
Lea, H. and E., Regent-street* ...	1,193	0	0

\* Accepted.

**LONDON.**—For covered lawn-tennis courts, West Kensington, for the directors of the Queen's Club, Ltd. Mr. A. Payne, F.R.I.B.A., 4, Storey's-gate, S.W., architect. Quantities supplied:—

Ashford and Co. ...	£3,643	0	0
Patman and Fotheringham ...	3,423	0	0
Army and Navy Auxiliary Co-operative Society ...	3,237	0	0
Longmire and Burge ...	3,140	0	0
Peto Bros. ...	3,102	0	0
Stimpson and Co. ...	3,100	0	0
Hall, Bedall, and Co. ...	2,993	0	0
Perry and Co. ...	2,993	0	0
Green, T. L. (accepted) ...	2,983	0	0

General work:—

Moreland, R., and Sons ...	£1,446	0	0
Army and Navy Co-operative Society ...	1,401	0	0
Handyside, A., and Co., Ltd. ...	1,329	0	0
Matt, T., Shaw, and Co. ...	1,206	10	0
Young, H., and Co. ...	1,195	0	0
St. Pancras Iron Works ...	1,159	0	0
Rownson, Drew, and Co. ...	1,095	0	0
Lyssaght, J., Ltd. ...	1,084	18	0

Ironwork:—

Moreland, R., and Sons ...	£1,446	0	0
Army and Navy Co-operative Society ...	1,401	0	0
Handyside, A., and Co., Ltd. ...	1,329	0	0
Matt, T., Shaw, and Co. ...	1,206	10	0
Young, H., and Co. ...	1,195	0	0
St. Pancras Iron Works ...	1,159	0	0
Rownson, Drew, and Co. ...	1,095	0	0
Lyssaght, J., Ltd. ...	1,084	18	0

**LONDON, W.**—For alterations to provision stores, 279 and 281, Edgeware-road, W., for Mr. W. Bowron. Mr. T. Durran, A.R.I.B.A., 44, Upper Baker-street, N.W., architect:—

Stevenson ...	£1,170	0	0
Lovell ...	1,150	0	0
Drysdale ...	1,139	0	0
Turtle and Appleton ...	982	0	0
Higgs (accepted) ...	927	0	0

**MAIDSTONE.**—For the erection of the Hollingworth memorial buildings at the West Kent General Hospital:—

Elmore ...	£1,869	0	0
Wilkins ...	1,738	0	0
Cox Bros. ...	1,724	0	0
Clements ...	1,678	0	0
Wallis ...	1,632	0	0
Vaughan ...	1,582	0	0
Avard ...	1,568	0	0
Bard ...	1,540	0	0
Gandler (accepted) ...	1,485	0	0

**SHALCOMBE, I.W.**—For the construction of new roads at Shalcombe, for the Isle of Wight highway commissioners:—

Collier, F. ...	£545	10	0
Kingswell, J. (accepted) ...	485	10	0
Reason, G. ...	449	10	0

**STAFFORD.**—For works of painting at the Borough Hall for the town council:—

Gee, A., (accepted) ...	£99	0	0
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**THEDDLETHORPE, LINCOLNSHIRE.**—For the erection of a Primitive Methodist schoolroom:—

Hall, Theddlethorpe (accepted) ...	£95	1	3
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(Lowest of nine tenders relieved.)

**WALES.**—For building a new house at Llanvihangel Gobion, Abergavenny, for Mr. D. Williams. Mr. R. Williams, A.R.I.B.A., 8, John-street, Adelphi, W.C., architect. Quantities by the architect:—

Meadows, T., Abergavenny ...	£728	0	0
Morgan and Evans, Pontypool ...	667	7	0
Foster, T., Abergavenny ...	660	0	0
Burgoynne, J., Blaenavon (accepted) ...	625	0	0

**WARRINGHAM, SURREY.**—For the erection of a detached residence on the Westhall Estate, for Mr. F. Goodingham. Mr. F. W. Fryer, M.S.A., 2, Pancras-lane, E.C., and Croydon, architect. Quantities by Mr. H. J. Player Bromley:—

Rich, J., Beckenham ...	£717	10	0
Jones, T. W., Beckenham ...	717	0	0

**WOODSTOCK, OXFORDSHIRE.**—For the erection of a boat-house, garden tea-room, and storage, Blenheim Palace, for His Grace the Duke of Marlborough. Messrs. Radclyffe and Watson, Birmingham and Oxford, architects:—

Estate Building Yard (Nash, E.) accepted.

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<b>Railway Stations.</b>	<b>Broadstone,</b> Dublin Bardett Road Barscough Acton Green Aldersgate Aldgate Althorp Park Altrincham Aston Ash Street, Stockport Birmingham, New Street Banbury Barnsley Barnsley Batley Bedminster Bescot Junction Birmingham Bishopgate Blackfriars Blackfriars Bridge Blake Street, Sutton Coldfield Bladon-on-Tyne Blechnley Bolton Bolts Bridge Bombay, India Bow Bowdon Central Brick Lane Bristol Broadfield Broad Street	<b>Broadstone,</b> Dublin Bardett Road Barscough Acton Green Aldersgate Aldgate Althorp Park Altrincham Aston Ash Street, Stockport Birmingham, New Street Banbury Barnsley Barnsley Batley Bedminster Bescot Junction Birmingham Bishopgate Blackfriars Blackfriars Bridge Blake Street, Sutton Coldfield Bladon-on-Tyne Blechnley Bolton Bolts Bridge Bombay, India Bow Bowdon Central Brick Lane Bristol Broadfield Broad Street	<b>Ealing Terminus</b> Earl's Court Kentish Town Kilburn Kilby King's Cross King William Street Langley Green Latimer Road Lea Bridge Leamington Leman Street Leyland Leyton Leytonstone Lichfield Limehouse Lincoln Little Ealing Liverpool Road, Manchester Llandudno Long Buckby Londoun Road Ludgate Hill Highdram Road, Walsend Hollinwood Holyhead Homerton Horley Hounslow Hounslow Bar- racks Keighley Kemble Junction Kilworth Kensal Green Kentish Town Kilburn Kilby King's Cross King William Street Langley Green Latimer Road Lea Bridge Leamington Leman Street Leyland Leyton Leytonstone Lichfield Limehouse Lincoln Little Ealing Liverpool Road, Manchester Llandudno Long Buckby Londoun Road Ludgate Hill Highdram Road, Walsend Hollinwood Holyhead Homerton Horley Hounslow Hounslow Bar- racks Keighley Kemble Junction	<b>Monkwear-</b> mouth Moorgate-street Monument Newcastle- under-Lyme New Cross Newport Newton Heath North Brentford North Bridge Northampton (Castle Station) Nottingham Oldbury Old Ford Oldham (Mumps) Paddington Parsons Green Patricroft Penzance Pickle Bridge Plaistow Pleek Plymouth Poplar Portsmouth Prestwich Radcliffe Roe Salisbury Road Seething Lane Shadwell Sheffield Shoreditch Sloane Square Snow Hill, Bir- mingham	<b>Slough</b> Soho South Bromley South Kensing- ton Southport Speke Spring Grove Stechford Stepney Stoke Stourbridge Stratford Stretford Sudbury Sunderland Sutton Coldfield Temple Thornton Torquay Tower of London Tring Tynemouth Upton Park Victoria Victoria Park Walham Green Walsend Walsall Waterloo, Liverpool Weaste Werneth, Old- ham Westbourne Park West End Lane	<b>Westminster</b> Whitechurch Whitechapel Whitefield Whitley Widnes Willenhall Bridge Willesden Wood Green Wormwood Scrubs Worsley Wolverhampton Wolverton <b>Barracks.</b> Aldershot Ashton-under- Lyne Barnet Belfast Barnbrook Burnley Catterham Chatham Chester Coventry Curragh Camp Dublin, Beggars' Bush Dublin, Island Bridge Dublin, Ship Street Dublin Royal Barracks Dundalk	<b>Dublin Castle</b> Police Barracks Eastney Fleetwood Fulwood Halifax Hamilton, Glas- gow Hulme Knightsbridge Leicester, Glen Parva Manchester Newbridge Newcastle-on- Tyne Normanton Northampton Norwich Portsea Portsmouth Preston Regent's Park Salford Shorncliffe Trim Warley Winchester Woolwich Wrexham	<b>Schools, &amp;c.</b> Belfast Method- ist College Battersea, St. Mary's Church Birmingham, Copper Street Clapham Colchester Forest Gate Hanway Place Harrow Haverstock Hill Orphan Work- ing School Jamaica Level Leyton, Gram- mar School Leyton, Church Road Newhaven North Bow Old Ford Poplar, Byron & Bright Streets Southsea, Church Path Southsea, Omega Street	<b>Stratford, Col-</b> grave Road Stratford, Sal- way Place Sutton St. Jude's Tayport Torrington Upton Cross Wandsworth <b>Hospitals.</b> Belfast County Lunatic Asy- lum Greenwich In- firm Guy's Hospital Lincolnshire County Asylum Middlesex Coun- ty Lunatic Asylum Netley Hospital Peterborough Infirmary Rugby Asylum Northfield St. Thomas's Hospital
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# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

VOL. LV.—No. 1756.

FRIDAY, AUGUST 31, 1888.

### ADDITIONS AND ALTERATIONS TO BUILDINGS.

THE alteration of one architect's design by another is one of the frailties incident to human hopes, for the restorer very often deals unceremoniously, and anything but tenderly, with the original design. We can recall some glaring instances of alteration, or rather mutilation, in our experience—churches in which the plan has been entirely ignored by lengthening or the addition of transepts, aisles of preposterous width and height, towers and spires of altitude disproportioned to the edifice; in domestic buildings, of extraordinary additions of apartments and offices. Like other professional men, doctors and lawyers, architects prefer to follow their own bent, they do not care about being "second fiddles," the result of which assertion of independent judgment is that we have buildings so completely transformed that their individuality is lost. An alteration of a design is a trouble from which other artists, painters, and sculptors are exempt. Who would dare to try his hand on a painter's work, to tamper with a Raphael, a Reynolds, or a Turner? Buildings combine the utilitarian with the artistic, and as their object is use, the architect's design is sacrificed. From what we know of the practice of the mediæval architects, little scruple was experienced about altering an old building, what was done was done boldly and without hesitation; but they were careful to carry out the original plan as far as possible, and to leave the style of the old intact, preferring to make any addition in the style of their own day, so that of the new portion there should be no doubt, and that those who ran could read. The modern restorer departed from this plan when he began to restore old English churches to the original style—prompted by a mistaken zeal, veneration, and respect for the old structure. But with modern works he has no such conscientious and punctilious feeling—he is neither exact nor precise, and follows the old rule, but without method. If there is a plan to follow he invariably prefers one of his own, the details he tries to alter or improve, or he makes his additions so intensely unlike in style as to create a feeling of disgust or cause a shock to everyone with a sense of fitness or congruity. We see in one church an arcade of pointed arches of rather acute form lengthened by the addition of flat Tudor ones at the west end, or an Early Pointed addition to a building in Late style. Now the old builders, in following their common-sense notion of alteration or restoration, never did anything so ridiculous as to turn a 13th century edifice into one of the 11th century, or introduce a Norman into an Early English or Decorated church, or one of the latter styles into a Perpendicular building. They would never have gone backwards and singled out a style of a century earlier. These are anomalies that have rendered modern architecture and architects supremely ridiculous in the eyes of the intelligent. Turning to instances, we now how Salisbury and Hereford suffered under Wyatt, what barbarous vandalisms were committed under the name of restoration at Worcester and Durham, and scores of other cathedral churches, including St. Albans. One of these ignorant and unintelligent customs was to remove every-thing Perpendicular in style; the flat-pitched roof gave place to a new steep one, groined and ribbed, or more commonly a stained deal

"open-timbered" roof, worse for sound, and often less architectural. The oak panelling and Renaissance details in the chancel were taken down; the chancel itself, the most interesting and time-honoured portion of the edifice, was even removed to lengthen the church, and a modern one built; the Perpendicular tracery was replaced by some of earlier style. We cannot now understand this infatuated contempt for the latest phase of English architecture, the very one which seemed to be in harmony with modern civilisation and reformed doctrines of the Church. We have only to read Murray's "Handbooks" to see how completely our cathedrals and churches have been restored away during the last half-century.

Our object now is more practical. What has been done is past recalling. One of the bitterest enemies of the architect is the unscrupulous builder who is called in to make alterations. He does so without the slightest regard to proportion. His addition of a bay window or a porch, should there be any other from which he draws his inspiration, is to make it a duplicate, a great deal wider or narrower, as the case may be. The way he proceeds is to observe the same details, but to extend the window or door in width, the result being a perfect travesty of the original. Who has not seen an order widened in its intercolumniation, but observing the same proportions of column, a mullioned window extended by placing the mullions further apart, or a gable heightened without any attempt to modify the position of the openings or the treatment of the details. Some time ago we inspected a large house to which the addition of a new wing had been made. The house was designed by a London architect, and bore evidences of careful design. It had a gabled projection at one end of the front; the new addition comprised a gabled projection of similar external character at the other end, the interior rooms consisting of a large drawing-room and bedrooms over. The addition was wider than the corresponding wing, though a repetition of the same features appeared in it. It was evidently a builder's addition. The interior of the new drawing-room was ill-proportioned, the height of the room had been increased. The interior looked meagre and cold compared with the older room on the other side of the house; the builder had copied all the details—the same doorway architraves, the same cornice and chimney-piece—in spite of the fact that the new room was larger and higher than the old one. The cornice looked small and out of character, and the same want of relation was observed between the chimney-piece and the room. It was easy to see where the architect's work ended and the builder's began. Still more painful is the case of an addition to an old design where there is nothing to guide the builder in the design. One example of this was the building of a tower to an Italian residence. The tower was built on one end of the building, and the builder had introduced on three sides copies of the windows of the front of the house utterly out of keeping with it. Even the upper story had a square-headed architrave finished window inserted like the ones under the cornice of the house. The whole design was irretrievably spoilt by this addition. In another case a large billiard-room was tacked on to the side of a house, forming a low wing; it was lighted by a skylight and by two large windows in front; but these were of bad proportion, round-headed, and did not correspond with anything else in the façade, while the balustrade and cornice returned abruptly against the façade on a level with the centre of the windows. The exterior was irretrievably spoilt; the principal room windows were dwarfed, the addition appearing more like a lecture-room or chapel. We

might multiply instances of porches, conservatories, and bay windows that have been added to the detriment of the original design; but who can say anything? The owner can surely do what he pleases; only the poor architect can complain of the transformation or mutilation that has been sanctioned in his design, which he could have avoided if he had been consulted. Perhaps, however, he has only himself to blame for having designed a house without the accommodation. A builder would have little sympathy with the architect's elevation if working to it entailed any labour or skill on his part; he would set to work in the easiest manner, adding here or pulling down there. Owners, unfortunately, do not trouble. The building passes into other hands, and the contemplated additions or alterations are given to another architect, or placed into the hands of a builder. Many a building is spoiled by not being able to obtain the original architect's services. With regard to public buildings, the same failures are repeatedly met with. Unfortunately, plans of schools, hospitals, municipal buildings, are accepted without any provision for future extension; increased accommodation is demanded, an addition is made to the building which completely mars the design by throwing it out of proportion or making it one-sided. The common plan of adding a story destroys the harmony or balance of proportion in nine cases out of ten. Few buildings can stand an addition to their height. An extension in length is more tolerable, provided ground can be obtained and a suitable break made in the elevation; but the least objectionable form of addition is that which has been provided for in the plans by lateral or rearward additions.

The more perfect a building or design, the less capable is it of receiving additions, and the more skill is necessary in the work. It is very difficult, for example, to add to a cruciform church, or one with a perfected plan, without destroying its proportions; the same difficulty is experienced in altering or enlarging a public building whose façades are well balanced. Alteration is in either case more or less a spoiling process. Enlargement or rebuilding is the alternative to which the architect must submit in these days of constant demand for accommodation, and if he can provide in his plans means by which addition can be made, he earns the gratitude of his patrons and the public.

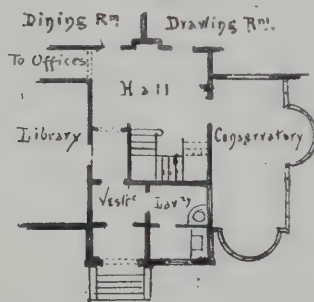
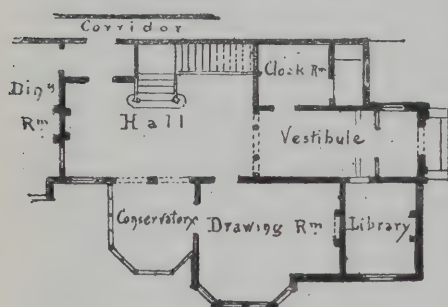
### HALLS AND STAIRCASES.—IV.

AS an addition to the hall, the conservatory is a feature of much beauty. Whether it is made to open out of a vestibule as a sort of adjunct to the porch, or to form the end or side bay of a hall, it can be designed in either case to contribute largely to the size and effectiveness of the entrance. The chief governing consideration is the aspect. A conservatory or show-house, to be really what its name implies, should be so situated as to catch the sun's rays for a certain part of the day at least. A south aspect is best for a lean-to horticultural building, but the western aspect is satisfactory, inasmuch as the latest solar rays, those of the afternoon, being the warmest, can be made economical in retaining warmth during the night. The east is a good aspect for the morning beams, though they pass off before the sun is at its hottest. The side least desirable for a conservatory is the north, though even with this aspect there is no reason why a plant house should not be added for the hardier kinds of shrubs and plants. Many plans suggest themselves. A porch at the side of a house may have a small conservatory or show house attached to the side of it, and this same conservatory may form a promenade or lobby between the porch and a reception room to which it is attached. For example, the front room of



a street house may have much of the noise and dust of the thoroughfare excluded from it by a conservatory attached to the front, one end of which could open into or connect with the front porch. The view of the plants could be enjoyed equally by those entering the porch or vestibule as by persons sitting in the room. Plan 9 (see page 196 in our last issue) affords an example of a conservatory behind the staircase, and that can be made attractive in the hall. Plan 11, which we now give, shows the conservatory, or flower room, made to serve the drawing-room as well as the hall. Two arches screen off the hall on one side from the conservatory—the hall, in fact, is mainly lighted through the conservatory roof. One side of it adjoins the drawing-room, which has a French window or glazed screen in the wall, through which a charming glimpse into the conservatory can be obtained. Thus the refreshing beauty of the plants and flowers makes an attraction to both apartments. The hall arcade may be filled with a glazed screen. In the winter season the heating arrangements of the con-

Plan 11.



Plan 12

servatory would serve to warm the hall, and the warmth of the latter would conversely be of service in the summer evenings, thus an equalisation of temperature can be maintained. In town houses it is often possible to provide a recess or alcove to the hall that can be lighted above, which can be filled with potted plants, or a light area can be often appropriated by having a glass roof to be used as a show-room. The hall-conservatory arrangement has become a very general feature in the residences of the wealthy of late years, and its development offers a problem for architectural skill.

In our next plan (12) we show an arrangement of hall and staircase in which compactness and concentration have been the chief aims. The hall is screened by a vestibule and inner door from the entrance, and is lighted on one side through a painted glass window, the stairs ascending in a recess out of sight of mere callers. The doors of drawing and dining-rooms are symmetrically arranged on each side of a fireplace, which can be made to look cheerful and inviting in winter weather, and can be occupied by a jardinière or plant-house in summer. A square floor results from this plan, which can be laid with parquetry or tile; the fireplace, if of the hooded kind, can be made an ornament

feature, and be fitted with a movable stove or dog-grate. Spaciousness is realised when once the visitor enters the hall and sees the whole extent of hall and staircase combined. The interior vestibule is also extended as far into the house as is necessary to give a door into a library or reception room.

The third arrangement of halls we have to consider are halls in the centre. This plan is adopted chiefly in large public buildings and mansions. The lighting is the chief difficulty. Unless a skylight or lantern is used to throw the light from the sky directly downwards into the hall, areas must be reserved for lighting. Halls lighted from the top or by lanterns admit of considerable architectural effect. A few of these we shall illustrate by plans. Thus, the hall may contain the staircase on the open-newel principle, the flights ascending or winding round the walls; or there may be a centre first flight with wing flights on each side. Three sides of a rectangular hall may be occupied by flights, and the fourth side have a landing. The cortile is a handsome development of a central hall, the stairs occupying a recess or an inner hall. An example of this arrangement is to be seen at the Reform Clubhouse, Pall Mall, and other buildings. In the Reformagrand hall, 56ft. by 50ft., surrounded by colonnades of the Ionic and the Corinthian orders, represents an Italian cortile; the upper landing is a picture gallery approached by a staircase. The light is admitted through a ceiling or domical lantern of diaphanous glass. At the corner of Charles-street and Regent-street, the Junior United Service Club has a good arrangement of hall and staircase, the latter lighted by a handsome lantern filled with painted glass. The Conservative Clubhouse, St. James's-street, designed by the late Sydney Smirke and Geo. Basevi, has a fine coved hall, with gallery round it, and a domical vestibule above. All of these and other clubhouses afford sumptuous examples of interior hall planning, in which the architect's skill has been prominently exercised. In no other portion of the interior has more ingenuity and taste been called into play. The architect has here endeavoured to impress the visitor with the resources of his art, and to produce a *coup de maître* to which all the other apartments contribute.

#### LAND SURVEYING.—VI.

TRIANGLES.—THE CONSTRUCTION AND USE OF THE THEODOLITE.

AS a general knowledge of trigonometry is necessary for the surveyor, it may be of service if we consider a few of the rules that are used in measuring triangles portions only of which are known. We have spoken of tables of natural sines, cosines, &c. The use of such a table is that when the number of degrees in a given angle is known, the value of the sine, cosine, tangent, and other ratios can be found. Or the logarithms of these ratios can be found in any logarithmic table. When the degrees in the angle are unknown, we can find it by a simple proportion, as we have already hinted in the last article. Let us make this clear. Fig. 12 is a right-angled triangle with sides  $a, b, c$ , opposite the respective angles  $A, B, C$ , drawn to scale. Let us take  $B$  as the angle required. Then we can say as  $c$  is to  $b$  so is  $1.0$  to sine  $B$ ; or as  $c$  is to  $a$  so is  $1.0$  to cosine  $B$ , or as  $a$  is to  $b$  so is  $1.0$  to tan.  $B$ . These proportions can be simply expressed thus—

$$\begin{aligned} c : b :: 1.0 : \sin. B &= \frac{b}{c} \\ c : a :: 1.0 : \cos. B &= \frac{a}{c} \\ a : b :: 1.0 : \tan. B &= \frac{b}{a} \end{aligned}$$

Or, when the perpendicular is divided by the hypotenuse the quotient equals the sine; when the base is divided by hypotenuse the

quotient equals the cosine; or when the perpendicular is divided by the base the quotient equals tangent; these divisions being expressed by the fractions given above. The other parts of the triangle are similarly obtained. Thus the base divided by the perpendicular equals the cotangent; the hypotenuse divided by the base equals the secant and the hypotenuse divided by the perpendicular equals the cosecant. Let us show the application of this proportion. Two sides of a triangle  $a$  and  $b$  are measured with the right angle  $C$  between them. It is necessary to obtain the acute angles  $A$  and  $B$ . Of course, we can lay down the sides of the triangle by scale and draw side  $c$ , and take the angles by the protractor; but if accuracy is necessary the trigonometrical rule is the proper method of proceeding. Let us suppose the side  $b$  measures 6 chains and the side  $a$  8 chains. By referring to the proportion above given we find that, having the base and perpendicular of a triangle, the tangent of either angle can be obtained. Thus:

$$\tan. B = \frac{b}{a} = \frac{6}{8} = 0.75,$$

and, looking at the table of natural sines and tangents, we find that tangent  $0.75$  represents an angle of about  $36^\circ 52' 12''$ . Then the right angle  $C = 90^\circ$ , the angle  $B = 36^\circ 52' 12''$ . If we deduct the latter from  $90^\circ$ , the remainder is  $53^\circ 7' 48''$ , which is the measure of the other acute angle  $A$ .

It is often required to find the perpendicular of a right-angle triangle, as when the height of an object is required, and we can only measure a distance on level ground for the base and take the angle subtended to the top of the object. Let  $b$  be the height of a tower, and  $BC$  or  $a$  the distance measured. Take the angle  $B$ ; then  $b = a \tan. B$ —an equation which means that the base is multiplied into the tangent of the angle  $B$ . If we say the base measures 3 chains and the angle measures  $31^\circ$ , the tangent of  $31^\circ$  is found to be  $.600$ , and  $300 \times .600 = 180$  links for the height, which can be brought into feet.

In surveying, however, we have more to do with oblique-angled triangles. If at the apex of any triangle a perpendicular is drawn to divide it into two right-angled triangles, the lines and angles may be treated by the same rules. As we have already pointed out, a more simple mode of dealing with this class of triangles is derived from the theorem that the sines are in proportion, as the sides opposite to them or which subtend them. Thus, in the oblique-angled triangle (Fig. 13),

$$\sin. B : \sin. A :: b : a; \text{ or}$$

$$a = b \frac{\sin. A}{\sin. B},$$

and so on for the other sides.

Referring to the cases of triangles in our last article, let us take a triangle in which a side and two angles are given. Let  $BC$  be a measured base line, and  $A$  an object, the position of which we require to know; angles are taken at  $B$  and at  $A$ . Since the three angles of a triangle are equal to two right angles or  $180^\circ$ , we have simply to deduct their sum from  $180^\circ$ . Therefore,  $C = 180^\circ - B + A$ . The given base line measures 40 chains; what are the lengths of  $b$  and  $c$ ?

By the equation—

$$b = \frac{a \sin. B}{\sin. A}$$

To find angle  $C$ . Let  $A$  equal  $18^\circ$ ,  $B$  equal  $42^\circ$ , then  $18 + 42 = 60$ , and  $180^\circ - 60 = 120^\circ$ , the angle  $C$ . The natural sine of angle  $A = 18^\circ = .309$ , and the natural sine of angle  $B = 42^\circ = .669$ . Then—

$$\frac{43 \times .669}{.309} = 93.110$$

or the side  $b = 93$  chains. For the other side we have the equation—

$$c = \frac{a \sin. C}{\sin. A}$$

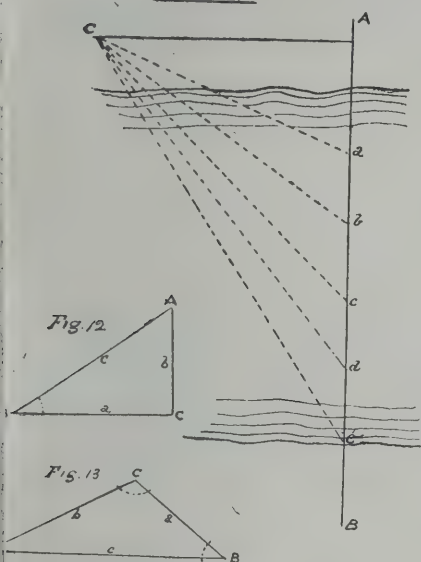
or the base measures  $120\frac{1}{2}$  chains, if worked



out in the same manner, and to only three places of decimals. Suppose the angles at the end of measured line  $a$  be taken, the lengths of the lines  $b$  and  $c$  can be found, and the position of  $A$  determined in a similar manner.

In diagram 9 we give another useful example of theodolite surveying. Let us suppose  $a, b, c$ , and  $d$  are the positions of the piers of a bridge across a river, and it is required to take their distances apart. From  $A$  on the bank of river erect a perpendicular  $AC$  five or six chains long. Set up flags or mark the centres of each pier of the bridge. From  $C$  measure the several angles  $ACa$ ,  $ACb$ ,  $ACc$ , and  $ACd$ , &c. Now  $CAB$  is a right-angled triangle, and the several lengths  $ACa$ ,  $ACb$ ,  $ACc$ , &c., are tangents to the angle  $C$ , and can be accurately determined by taking the angles at  $C$ , and referring to a table of natural tangents. Say the first angle to  $a$  measures  $35^\circ$ . The natural tangent is .70021. Multiplying this number by the base or radius (call it 400ft.), the product is 270ft., which gives the distance  $ACa$ . The next angle to point  $b$  is  $52^\circ = 1.2799 \times 400 = 511.96$ ft. To point  $c$  the

PLAN 9



angle is  $80^\circ = 2268.48$ ft., and so on for the other piers. Thus, the length of the several piers may be accurately calculated. The valuable rule expressed by the simple formula  $AC \tan C$  can be employed to set piers, to measure the distances between several streams which cannot be crossed by a chain, or the distance of any object on a plain line to which a perpendicular can be erected, as well as to obtain the height of a tower by the measured base line and angle already referred to. Small fractions or minutes of a degree may be neglected, as they often give trouble.

#### THE THEODOLITE, AND METHOD OF USING IT.

The construction of this invaluable instrument is familiar to most of our readers, and descriptions of it may be found in most treatises on surveying, it is unnecessary here to enter into any particulars of its adjustments and use. The best knowledge of an instrument is that derived from practice, and a person or two in the field will be of more service to the student than the perusal of any amount of instructions, which only serve to bewilder. The most important point which the student ought to direct his attention to is the construction and division of the two circular plates, the lower limb, and the upper plate, which turns freely upon it, and the vernier plate. In taking horizontal angles these two parts are constantly brought into use, while the whole limb can be turned through any horizontal angle, the

upper vernier plate only may be moved through any desired angle. The lower limb or plate is generally graduated to 30 minutes of a degree. By means of the vernier the graduation can be read to single minutes. A 6 in. theodolite has generally two verniers  $180^\circ$  apart. In a limb divided at every 30 minutes, 29 of these parts are made equal to 30 divisions of the verniers, by which we can read off  $\frac{30'}{30}$  or  $1'$ . For the benefit of the

beginner we may explain here the construction of this useful contrivance for estimating subdivisions on the lower limb, as the vernier is attached also to sextants and other instruments.

Let us suppose the limb divided into degrees, and each degree into four parts, each of these subdivisions will denote 15 minutes, or a fourth of a degree. The divisions and subdivisions of the vernier indicate single minutes and seconds, and are numbered from right to left; the extreme right one is zero or a V. The space between the lines denoting a minute is also divided into four, and each of the dividing lines will register 15 seconds. The result of these graduations on the limb and the vernier is that the limb is divided into 15 minutes, and the vernier into 15 seconds. If the zero of the vernier coincide with a division, say, 25, then the reading is  $25^\circ$ , and the same with any of the long divisions of the scales; but if the zero is between, say,  $25^\circ$  and  $26^\circ$ , the reading will denote some minutes or other fraction of a degree. Generally, however, the zero points to no marked division of the graduated limb, but to somewhere between. We then look for the degrees and minutes indicated by the divisions that are passed, and also for a line on the vernier that coincides with one on the limb. Then the number of minutes and seconds from that line to the zero added to the number read off from the limb gives the required angle. By this mode of subdivision an angle can be read to seconds with great accuracy.

Let us suppose the limb is divided into 15 minutes, and these are subdivided by the vernier to 15 seconds. The zero points to a fraction beyond the third small subdivision of the limb after  $25^\circ$ , which roughly shows that  $25^\circ$  and something more than  $45'$  is registered. Looking for a line in the vernier which exactly coincides with one on the limb, we find that from the zero  $1\frac{1}{2}$  minutes is registered, which, added to the  $25^\circ 45'$ , makes  $25^\circ 46' 30''$ , the angle required. As above stated, in small theodolites the degrees are usually divided into two equal parts, denoting 30 minutes, and the vernier divisions show minutes, so that any seconds would have to be estimated by the eye. After some practice, this, however, can be done with tolerable accuracy. For great accuracy the vernier is read by a microscope attached to the limb. It is needless to say that before an angle can be taken the theodolite must be in perfect adjustment. It must be firmly planted on the ground, and plumbed over the station or point from which the angle is to be taken; the parallel plates at the bottom of the instrument must be levelled as nearly by the eye as possible, then by two of the staff screws, turning first one and then the other, till the bubble is in the middle of its run, then turning the instrument half-round and repeating the operation with the two other screws. The other adjustments having been made, the instrument is in readiness for taking an angle.

#### STRAINS.—IV.\*

By G. A. T. MIDDLETON.

FLANGE STRAINS (continued).

IN flanged beams the strains are caused by the reactions of the supports, and not by the load itself, the greatest strains being under the

load. When a beam has to carry a fixed central load, the bent lever causing the maximum strain

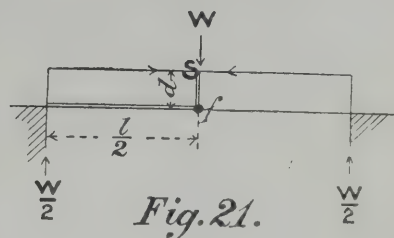


Fig. 21.

in the top flange is as shown in Fig. 21,  $f$  being the fulcrum, and the equation of moments—

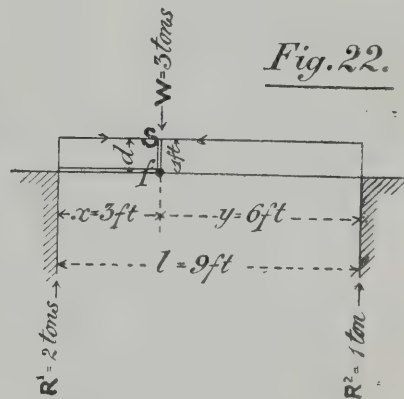
$$S \times d = \frac{W}{2} \times \frac{l}{2},$$

or

$$S = \frac{Wl}{4d}.$$

If the load be not centrally placed, the strain beneath it is found in precisely the same manner, the reaction at either support being taken to produce the bending moment: whichever be taken, the strain discovered to exist in the flange under the load will be the same. An

Fig. 22.



example is given in Fig. 22, where the bending moment may be taken to be either  $R^1 \times x$  or  $R^2 \times y$ —in either case, 6 foot-tons. In other words—

$$\begin{aligned} S \times d &= R^1 \times x, \text{ or } R^2 \times y \\ \therefore S &= \frac{R^1 \times x}{d}, \text{ or } \frac{R^2 \times y}{d} \\ &= \frac{2 \times 3}{1}, \text{ or } \frac{1 \times 6}{1} \\ &= 6, \text{ or } 6. \end{aligned}$$

The strains at intermediate points are found as shown in Fig. 23— $R^1$ , the reaction at the abutment A, causing the strains at all points between that abutment and the point of application of  $W$ , and  $R^2$  causing the strains at all points between the abutment B and the point

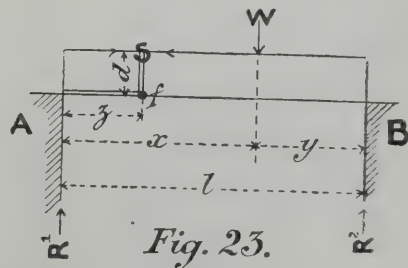


Fig. 23.

of application of  $W$ . In Fig. 23 it is assumed that the flange strains are required at a point at which

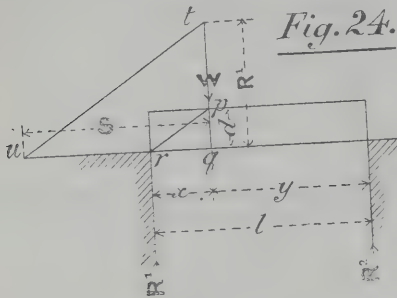
$$\begin{aligned} S \times d &= R^1 \times x \\ \text{or—} \\ S &= \frac{R^1 \times x}{d}. \end{aligned}$$

This value of  $s$  is evidently greatest when  $x$  is greatest—that is, when  $s$  is required under the load—and least when  $x$  is least, viz., at the abutment, when  $x$  is nil and  $s$  consequently is nil also. The strain varies uniformly according to the value of  $x$ .

The value of the strains under a fixed load, whether it be central or otherwise, can be



ascertained graphically as shown in Fig. 24, in which the same letters have been used as in Figs. 16 and 19. From the bottom flange under the load  $tq$  is set up equal to  $R^1$  to any scale of weights,  $p$  and  $r$  are joined by a straight line, and through  $t$  a line  $tu$  is drawn parallel

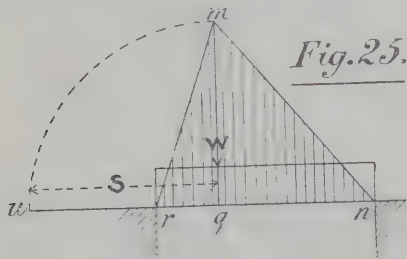


to  $pr$ .  $S$  is now denoted by  $qu$  to the same scale as that to which  $tq$  was set up. This depends upon similar reasoning to that adopted before, for  $pqr$  and  $tqu$  being similar triangles,

$$\begin{aligned} \text{or, } qu : qr :: tq : pq \\ \therefore qu = \frac{tq \times qr}{pq} \\ = \frac{R^1 \times x}{d} \end{aligned}$$

and therefore  $qu = S$ . This agrees with the result arrived at above when considering Fig. 22

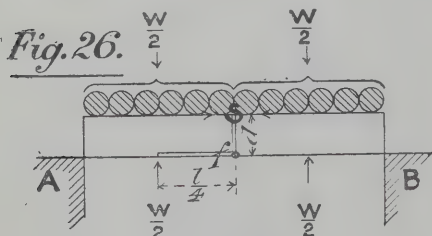
To determine the strains at intermediate points set up  $qm$  vertically from the bottom



flange under the load equal to  $qu$  or  $S$ . (See Fig. 25).

Join  $mr$  and  $mn$ , then ordinates set up from the bottom flange to  $mr$  and  $mn$  will give the strains at any intermediate points.

It is easiest to ascertain the strains in a flanged beam due to a distributed load by making an assumption. Two or three different assumptions will lead to the desired result; but perhaps the easiest to comprehend is that shown in Fig. 26. The proportion of the load



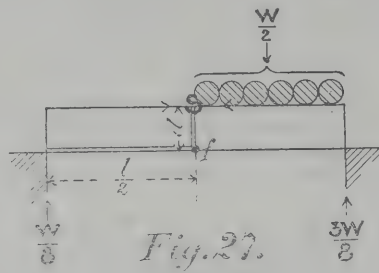
on the half-beam nearest to the abutment A, instead of reacting at A, is assumed to act at its centre of gravity.

By this means the lever causing strain at the centre becomes as shown, and—

$$\begin{aligned} S \times d = \frac{W}{2} \times \frac{l}{4} \\ \text{or, } S = \frac{Wl}{8d} \end{aligned}$$

The same result can be arrived at directly, without assumption, by supposing each half of the load ( $\frac{W}{2}$ ) to act at its centre of gravity as a fixed load. Then the reaction at the

further abutment due to this half-load is  $\frac{W}{8}$  (see Fig. 27), causing strain at the centre with a leverage of  $\frac{l}{2}$ —this strain being half the strain which would be produced were the



girder loaded throughout its whole length, or  $\frac{S}{2}$ , as a similar strain would be produced by the load lying on the other half of the girder. Thus—

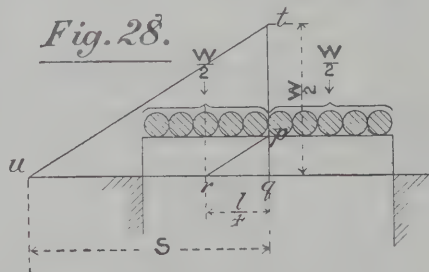
$$\begin{aligned} \frac{S}{2} \times d = \frac{W}{8} \times \frac{l}{2} \\ \text{or— } \frac{S}{2} = \frac{Wl}{16d} \\ \text{or— } S = \frac{Wl}{8d} \end{aligned}$$

the same result as before ascertained.

The strains at intermediate points can be similarly ascertained by assuming the portion of the load on either side of the point at which the strain is desired to be a fixed load acting at its centre of gravity, ascertaining the strains produced by each of these loads at the required point, and summing them.

The strain is greatest at the centre, and is nil at the supports, but varies between these points in a compound ratio, which is sufficiently indicated in the last paragraph.

These strains can be ascertained graphically, as shown in Fig. 28, in which the



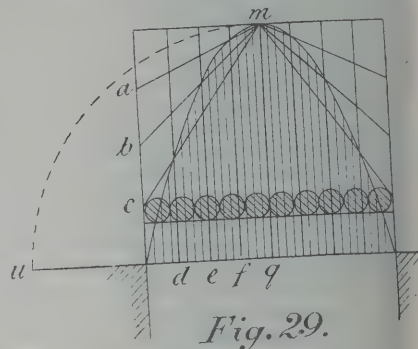
same letters have been used as in the previous examples (Figs. 16, 19, and 24)  $tq$  being set up over the centre equal to  $\frac{W}{2}$  to a scale of weights, and  $qr$  being taken equal to  $\frac{l}{4}$ . Then  $qu$  is equal to the strain in the centre. The reasoning is exactly similar to that adopted before, for  $pqr$  and  $tqu$  being similar triangles.

$$\begin{aligned} \text{Or— } qu : qr :: tq : pq \\ \therefore qu = \frac{tq \times qr}{pq} = \frac{\frac{W}{2} \times \frac{l}{4}}{d} = \frac{Wl}{8d} = S. \end{aligned}$$

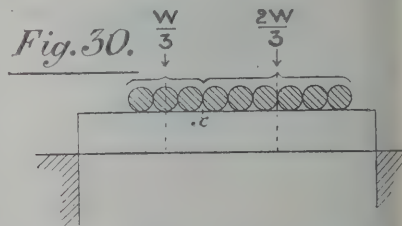
The intermediate strains are more readily ascertained geometrically than arithmetically (see Fig. 29). Set up  $qm$  vertically over the centre of the bottom flange equal to  $qu$  or  $S$  as previously ascertained, and describe the parabola as shown (in the same manner as explained to Fig. 20). Ordinates drawn from the bottom flange to the outline of this parabola will give the strains at any intermediate points.

When a load is distributed over only a part of a girder, the remainder being unloaded, it is usual to assume the load to be a fixed load acting at its centre of gravity. This can be done without great error when the load covers only a small portion of the length of the girder, while such error as occurs is on the side of safety; but when the load and the proportion of the girder which it covers are considerable, it is wisest to ascertain the strains at all points

correctly according to the method explained with Fig. 27, and as shown, perhaps more clearly, in Fig. 30, by taking several points,  $x$ , assuming the load lying on each side of  $x$  to act at its centre of gravity, ascertain



the strains at  $x$  due to each of these parts, the load, and summing them. By doing this at several points a strain outline can be set up which will delineate the strains at all points as is done in Figs. 25 and 29. It will be noticed however, that the curved outline will not extend over that portion of the beam which loaded; over the unloaded portion the outline



will be exactly the same as it would have been had the load been a fixed load acting at centre of gravity. The error of assuming  $t$  load to be fixed is thus seen to be slight, and only to affect the portion of the beam which loaded, while its rectification is only of importance as saving the employment of unnecessary material in the flanges under the load.

(To be continued.)

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—VIII.

By HENRY LOVEGROVE, F.S.I., Surveyor

JOINER (CONTINUED).

STAIRCASE LEADING INTO GARDEN.

THE following work to be framed together in white lead, and pinned with pins:—

ft.	in.	ft.	in.	
20	6			6in. x 4in. fir, wrought, framed, chamfered, 2 1/2 in. wide sill.
6	1			Notchings in do. for posts, 4 1/2 in.
6	9	8	0	4 1/2 in. by 4 1/2 in. wrought all round and framed posts.
6	1			Ornamental terminations to do. by 4 1/2 in. posts.
6	1			Oak balls 4 1/2 in. diam. fixed on posts.
2	4	9	15	3in. deal, wrought framed cross tongued in arched bays.
2	2	9	8	Add do.
3	6			4 1/2 in. by 4 1/2 in. wrought all round and framed posts.
2	4	8	9	Labour circular cutting on deal sides.
2	2	9	5	Add do. front.
2	5	3	18	Fir wrought all round, and fir bearers.
2	1			Ends built into wall and made good.
9	0			10 Fir wall plate.
9	0			Labour planing on fir.
9	6	85	6	4 1/2 in. by 1 1/2 in. yellow deal laid form lattice floor, wrought round and nailed with used iron nails.



ft. in.	ft. in.	
9 2 1	18	Wrought ends to do.
9 6		8 by 1½ do. do.
2 1		Wrought ends to 8in. x 1½in.
6 1		Notchings in 1½in. for 4½in. x 4½in. posts.
14 4		4 x 2½ oak wrought all round, sunk and chamfered both edges 1½in. girt.
8 1		Ends framed into fir posts
14 4		4 by 3 oak wrought and moulded handrail.
8 1		Ends framed into fir posts.
30 0 2 8	80 0	2in. deal square balusters, framed both ends to oak.
30 1		Ornamental turnings and cuttings to same 2ft. long.
2 5 6	11 0	4½in. x 4½in. deal, wrought all round newel as before.
2 1		Ornamental terminations to do.
2 1 0		Oak balls as before, 4½in. dia.
2 1 0	2 0	Concrete as foundations to post.
2 1 0		Dig and cart, part fill, and ram.
2 16 3	32 6	10in. by 2in. deal wrought all round string.
2 2 1		Ends housed to fir posts.
2 16 3	32 6	Oak handrail as before 4 by 3.
2 4 1		Ends of raking handrail framed to fir posts.
2 28 3 0	168 0	2in. balusters as before, one end framed to deal string, the other to oak handrail.
2 28 1 56		Turnings to do. as before.
17 3 6	59 6	1½in. deal treads 10in. wide, wrought all round, and rounded on front edge.
2 17 1 34		Ends treads with rounded nosings housed to strings.
2 1		Notchings in 1½in. treads to newels.
2 1		Labour to rounded nosing on 1½in. deal.
2 2 1		3in. lengths of do.
2 1		8in. lengths of do. cross-grain.
4 1		Mitres to do.

## STAIRCASE LEADING TO GARDEN.

The following works to be framed together in white lead and pinned with oak pins.

Dig and cart, part fill, and ram.  
6 Concrete.  
2 0 Ends timbers built into wall and facings made good.

Cube. Fir wrought all round and framed.  
6 Fir wall plate.  
10in. Sup. planing on fir.

2 3  
n. deal wrought framed and cross-tongued in arched boards.

10  
1  
un labour to rounded nosing on 1½in. deal.  
1 3in. lengths of do.

4 8in. do. cross-grained.  
2 Mitres to do.

in labour circular cutting on 3in. deal.  
3 2in. deal square balusters framed both ends to oak

80 0  
Ornamental turnings and cuttings to do. 2ft. long.  
4½in. by 1½in. yellow deal laths to form lattice floor wrought all round and nailed with galvanised iron nails.

85 6 Wrought ends to do.  
18 8in. by 1½in. do.

9 6 Wrought ends.  
2  
n. by 4in. fir wrought framed and chamfered 2½in. wide

11.  
6 Notchings in do. for posts 4½in. by 4½in.  
6 4½in. by 4½in. wrought all round and framed post.

58 0  
11 0  
Ornamental terminations to do.

6 10in. by 2in. deal wrought all round string.  
2 32 6 Ends housed to fir posts.

4 2in. balusters as before, one end framed to deal string, the other to oak handrail.

168 0  
n. deal treads 10in. wide wrought all round and rounded on front edge.

6 Notchings in 1½in. for 4½in. by 4½in. posts.  
6 Ends treads with rounded nosings housed to strings.

24 Notchings in 1½in. treads to newels.

2  
OAK  
n. by 2½in. wrought all round sunk and chamfered both

14 4  
4  
4 Ends framed into fir posts.  
8 4in. by 3in. wrought and framed and moulded handrail.

14 4 Ends framed into fir posts.  
32 6 8 Do. raking.

4  
n. 4½in. diameter fixed on fir posts.

## STAIRCASE LEADING INTO GARDEN.

The following work to be framed together in white lead and pinned with oak pins:—

Yds. ft. in. Cube. Dig and cart, part fill, and ram

1 11  
Concrete.  
No. 2. Ends timbers built into wall and facings made good to do.

1 Cube. Fir wall plate  
1 6 " Fir wrought all round and framed.

2 3 Sup. Labour planing on fir.  
28 " 3in. deal wrought, framed, and cross-tongued in arched boards.

18 Run. Labour circular cutting on 3in. deal

8 " Labour rounded nosing on 1½in. deal

No. 4. 3in. lengths of do. ....  
2, 8in. do. across grain ....  
4 mitres to do.

86 " 4½in. by 1½in. yellow deal laths to form lattice floor, wrought all round and nailed with galvanised iron nails

No. 18, wrought ends to do. ....  
8 x 1½ do. ....

60 " 1½in. deal treads 10in. wide all round and rounded on front edge

53 " 10in. by 2in. deal wrought all round string

No. 4 ends do. housed to fir posts  
80 " 2in. deal square balusters framed both ends to oak

168 " Do. one end framed to deal string and the other to oak handrail

No. 86 ornamental turnings and cuttings to do. 2ft. long

21 " 6 by 4 fir wrought framed and chamfered sill.

No. 6 notchings in do. for posts 4½in. by 4½in.

69 " 4½ by 4½ fir wrought all round and framed posts

No. 8 ornamental terminations to do.

No. 2 notchings in 1½in. treads to newels

No. 6 do. in 1½in. for 4½in. by 4½in. posts

No. 34 ends of treads with rounded nosings housed to strings

14 " 14in. by 2½in. oak wrought all round sunk and chamfered, both edges 1½in. girt.

No. 8 ends framed into fir posts.  
47 " 4in. by 3in. oak wrought framed and moulded handrail

No. 8 oak balls 4½in. diameter, fixed on fir posts.

Carried to summary ...

## CONSERVATORY.

The woodwork to be put together in white lead and pinned with oak pins:—

ft. in. 2 7 Red Corshill stone in sills and set in cement.

3 9  
1 3  
10 3 11

3 7  
1 3  
10 3 9

3 6  
1 3  
10 3 8

2 8  
1 3  
10 2 9

3 3  
1 3  
10 6 9

23 5  
3 4  
1 3 4 2

4 7  
1 3 5 9 Bed and joints, one for two.

4 5  
1 3 5 6

4 4  
1 3 5 5

3 6  
1 3 4 5

4 1  
1 3 5 1

30 4  
22 6  
2 11 65 8 Plain face.

1 2  
10 1 0 Add at end of front sill.

68 8  
18 3  
7 10 8 Circular sunk face.

1 9  
7 1 0  
2 9 1 7 Circular stopped sunk face.

1  
2 1 Mitre external to sinking, 7in. girt.

20 6  
6 9 Rebate, 4in. girt.  
Deduct and add.  
13 9 Do. stopped.

ft. in. 2 1  
8 1  
14 0  
6 0  
9 1  
4 1  
20 0

Stops to sinking, 4in. girt.  
Mitre to do.  
Dowels and mortices and cement.  
8in. by 4in. oak stopsunk weathered and throated sill.

Notchings in do. for posts.  
Wrought fair ends to do.

1in. by ½in. galvanised iron tongue and groove in oak and red Cors-hill stone and white lead.

2 6 6 13 0 6in. by 6in. fir wrought all round framed, rebated, and beaded posts at ends.

2 6 6 13 0 Bedding do. against brickwork and pointing in cement.

7in. by 7in. wrought all round, framed, and three times rebated and twice beaded posts at angle.

4 6 6 26 0 6in. by 6in. fir wrought framed twice rebated and twice beaded posts.

14 0  
6 3  
6in. by 4in. fir wrought framed, rebated, twice rebated, and weathered transom.

4 3 3 13 0 6in. by 6in. do. wrought, framed, grooved, and twice beaded arch piers circular on lower edge to top lights.

2 3 0 6 0 Add do.

15 0  
1 0  
6 7 6 Fir framed head.

7 0  
1 0  
6 3 6 Add end.

2 1  
2 1  
22 4  
1  
2  
20 8

Ends timbers built in in cement.  
3in. York stone templates 9in. by 9in., tooled and built in in cement.

12in. by 3in. deal moulding as cornice planted on.

Mitred and tongued angle.  
Ends scribed to brickwork.

8in. by 4in. deal moulding planted on.  
Mitred and tongued angle.

End scribed to brickwork.  
Do. to stone corbel.

Notching in moulding, 6in. girt.

2½in. deal wrought, and moulded side-lights with extra wide bars hung to open on butts.

6 1  
1  
Pairs 4in. wrought-iron butts.  
Elseys patent sash fastening for opening and closing set of three side-lights, total lengths of light 13 8.

Do. for two lights 5 9 long.

4 2 10  
3 8 36 10 26oz. sheet glass, and glazing in 9 squares each.

2 2 6  
3 3 16 3

4 2 10  
2 3 25 6 Lead quarries and tinted glass, &c., 3s. per foot superficial, and fixing to wood with all necessary saddle bars and copper wire complete.

2 2 6  
2 3 11 5  
36 9

14 8 9in. by 2in. deal, wrought played and moulded lower edge, pitching piece spiked to wall.

2 1  
8 9 16 3 Ends scribed.

3 1  
8 6 6in. by 4in. fir wrought framed and twice moulded rafters.

Ends built in in cement.

4in. by 3in. fir wrought framed and rebated moulded frame top light.

9in. by 3in. add do.

7in. by 3in. add do.

Labour scribing 3in. to brickwork.

Labour played edge on 3in.

2 3 6 7 0 4in. by 3in. wrought, framed, rebated, and twice moulded transom.

4 7 6 30 0 3in. by 2in. deal wrought double rebated and moulded sash bar.

2 2 3 9 15 0 Add do.

2 3 5  
3 8 25 1 3in. deal moulded top light hung.

2 1  
Pairs 4in. wrought-iron butts.

Sets of gearing for opening and closing top lights about 15ft. from floor.

Labour to rebate on deal.

2in. deal three-quarter bead planted on.

6 6 1  
1 2  
7 9 54 3 ¾ rolled plate glass and glazing in skylight.

2 3 1 2  
4 2 29 2 Add do.

2 3 1 2  
3 9 26 3 Add do.

8 9  
1 0 8 9 5lb. lead flashings stepped.

15 6  
9 11 8 Add apron.

15 6  
8 9 R.W. and point apron in cement.

Do. stepped.

15 0  
8 3 23 3 Close copper nailing.

16 0  
8 0 24 0 4in. C. iron eaves gutter, jointed in red lead, and screwed to wood-work.

2 1 2 Stopped ends (extra to).







WAYSIDE NOTES.

**E**LY CHAPEL, in Holborn, is one of the most interesting relics of the Middle Ages of which London can boast, and the little under-croft is certainly about the strangest place of worship in the metropolis. Attention has been directed towards this old building in the columns of the *St. James's Gazette*. On the 24th inst. an article on the chapel was published, and on the 27th a letter appeared from Mr. Alexander Wood, M.A., the author of the paper on "St. Etheldreda and her Churches in Ely and London," read in the chapel itself shortly before the acquisition of the building by the Fathers of the Order of Charity. Mr. Wood regrets, as we most of us do, the substitution of stone pillars in the crypt for the quaint old timber supports, which substitution, he says, has fostered the idea that the under-croft was originally intended as a chapel, whereas it was a place of sepulture, like the under-croft of Inigo Jones's chapel at Lincoln's-inn. In the old days, I take it, when the dark, massive oaken supports loomed in the uncertain light of this curious crypt, there was little danger of one's mistaking its original destination.

From the bustle of Holborn to the crypt of St. Etheldreda's Chapel is only a very few steps, but the contrast is so great that it at all times affords one pleasure to go out of one's way for five minutes to visit the chapel. Many such visits have I paid, since the bygone days when my good master first conducted me to the building. Strangely enough, one finds many architects who have never seen St. Etheldreda's, Holborn, and, incredible as it may seem, not a few who have been daily in town for years past have never entered the edifice, although it is in the possession of that church whose portals are seldom closed.

The Architectural Association's visit to Haddon Hall reminds me that Mr. Albert Hartshorne, who generally plays his music in a shrill key, has written to the *Athenaeum* complaining of some undesirable experiments that are being made on the woodwork of that interesting old building. It is said that the old oak panelling in the Long Gallery has been treated with linseed-oil, with the view, I presume, of giving it a more brilliant appearance, a glossiness, however, wholly out of keeping with antique oak joinery. This oiling after all, however, is not a very serious matter when compared with the treatment that much beautiful oakwood has, at one time or another, received in this country. It is a curious taste that leads one to bedaub old oak with paint, but there is a lot of interesting work in old houses so destroyed, or, at any rate, hidden away. I remember an old Essex country house where the whole of the oak work remained with an epidermis of white-lead for years and years, the owner evidently preferring it. Plain linseed-oil, therefore, is the least injurious substance that can be applied to old oak, and though it is difficult to see what good will come of the experiments at Haddon Hall, we may console ourselves with the reflection that little actual harm can be done.

Mr. J. T. Helby, member of the London School Board, has written to the papers, saying that he has received a large number of anonymous letters giving information of facts connected with the purchase of sites and erection of schools, which are most fully borne out by the evidence given before the Special Committee on the Works Department, obtained last October. This evidence, says Mr. Helby, has just been published, contained in over five hundred pages of matter, and he strongly urges upon those ratepayers of the metropolis who are interested in the doings of the London School Board to peruse it, as they will then understand how their money has been wasted, and how the Works Department has been conducted by past boards. In the face of statements such as these, some inquiry, I repeat, ought at once to be instituted. Another farce, such as the recent meeting of the Board, is not what is wanted; but a Commission of inquiry such as that presided over by Lord Herschell in the matter of the M.B.W. irregularities is urgently needed.

"Architectural Plagiarism" is an interesting subject. So far as my experience goes the client is more often than not the cause of plagiarism, although if the architect has any respect for himself and his profession he would lose a job rather than crib from another man's design, and produce that copy of somebody else's work which the public will often demand with a strange persistency. It is the commonest thing imaginable for a person to ask that the plans for his house shall be prepared "as much like Mr. So-and-So's as possible," or "exactly like that pretty villa at such-and-such a place." Only this summer—by which it may be necessary to explain that I refer to the season comprised in the last few months—I was asked if it would be convenient for me to take a rough sketch of a certain pretty perspective in the Royal Academy Exhibition, with a view to preparing plans for a building as much like the one exhibited as possible. Many will be able to call to mind cases where would-be builders have been much disappointed because they could not have their houses built exactly like some building that has taken their fancy. But, as I have said, although it may be difficult to convince a client of the immorality of copying another design, no architect with a sense of honour would give way to the temptation to please their client at the expense and to the annoyance of a brother professional. Moreover, it is easy to design a building that in the eyes of the public shall in effect be similar to another, although in reality totally different. As regards piracy pure and simple, I do not think that it prevails to any great extent in the architectural profession, as we know that to anyone worthy of the name of an architect it comes far easier to design new features than to adapt old ones. Only bunglers plagiarise, and their productions are so ridiculously unlike the originals they "copy," we surely need not go out of our way to abuse them. Of course, there are architects who have very queer notions about plagiarism. I know one old fogey who believes he has a special patent in gables and tile hanging, and honestly believes every builder who uses them has copied a pair of villas he once put up in a village where he and his relatives fancy every building, public and private, ought to be built from his designs.

"Flat" building on a large scale is about to be prosecuted at Chester. The Cross Gun-court, off Foregate-street, the property of the Duke of Westminster, has been demolished, and large blocks of model dwellings on the flat system are to be erected for artisans and others. It appears that each set will be very completely arranged, with its own conveniences, and "sanitated" on the most approved principles. The principle which most meets our approval is that a large space will be left free all round the buildings, instead of the whole block being continuous, with stagnant areas for many of the apartments as in London.

Are architectural partnerships a failure? I should say that they are very good things if properly arranged. The chief thing necessary to insure the happiness of partners in business seems to me to be a mutual appreciation of the laws of domination and subordination, which are of such far-reaching importance in every stage of architectural composition. Co-equality there cannot be. As one feature of a composition must be markedly dominant, so, if an architectural partnership is to be a life-long success, one of the partners must be looked up to and revered by the other or others; or, if mutual respect is the result of individual excellence in different branches—if, for instance, one respects the other because he is a true artist, while the other respects his co-partner because he is a skilled constructor and a good man of business, harmony will be the result, and all will go well. But if both pride themselves on the same peculiar accomplishment—if, let us say, both aspire to be gifted designers, the harmony will be assuredly changed into discord, and the sooner an architectural divorce takes place the better.

I do not speak from experience. But in journeying through life I have kept my eyes and ears open, and have, perhaps, had unusual opportunities for observing the working of architectural partnerships. I have observed

that the partnership of friends because they are friends is hazardous—very; that the union of incompetence and skill, of indolence and energy, and of virtue and vice, although formed with excellent prospects, is sooner or later attended with disastrous results; and I have observed that though there can be no real equality, that attribute may well appear to exist in the eyes of the world. And I have learnt that though it has been said that age cannot live with youth, this is scarcely true of an architectural partnership. The iron-grey head and unwrinkled brow work together, in our profession, with perfect harmony. Some degree of variation in character, in talents, and accomplishments, seem favourable to success. The worst partnerships are between men of the same mould of mind and character, with similar shortcomings. Much one could write on this question. I have touched only on the subject as affecting the interests of the partners. It would be interesting and instructive to hear some opinions from architects who can speak from experience, and also from those who have authority to speak on such partnerships as affecting architecture as a fine art. GOTH.

VENTILATING TUBES.

**T**HE quantity of air discharged per minute through a ventilator is variously stated, though one of the fundamental things to be known in ventilating any room. Of course the principle of the discharge is the difference in the temperature between the room and the external air—the greater the difference the more rapid the current, other things being equal; the height of ventilator is also an important condition. To take Hood's calculations, we find that, supposing the height of ventilator is 10ft.—an ordinary height of a room exit—and the difference between the interior and outer air is 5°, the cubic feet of air discharged per minute through a ventilator of 1ft. square is 116ft. At a height of 15ft. the discharge is 142c.ft.; at 20ft., 164ft.; at 30ft. it is 201ft.; at 40ft. in height it is 235ft.; and at 50ft. the discharge is 260c.ft. With a difference of 10° the discharge is for 10ft. height of ventilator 164c.ft., which is just equal to the discharge through a ventilator 20ft. high and with a 5° difference of temperature. At 15ft. the discharge is 202c.ft.; at 20ft., 232c.ft.; at 30ft., 284c.ft.; at 40ft., 329c.ft.; and at 50ft. high, 367c.ft. These figures are sufficient to show that height and temperature are both important conditions to the effectual ventilation of buildings, and that, if we cannot be sure of having our interiors warmer than the outer air—a state of things not unknown during summer weather—it is very necessary to place the outlet for vitiated air as high as it can be conveniently arranged.

CHIPS.

On Tuesday week, Archdeacon Blunt reopened the church of St. Mary at Watton, situated between Driffield and Beverley, after much-needed restoration. The high-backed pews have given place to benches, the chancel has been fitted with stalls, and the floor of the church has been entirely relaid with Staffordshire tile pavement. Messrs. G. Shepherdson and Son, of Driffield, carried out the works.

The death is announced of Mr. Robert Collins, C.E., the chief engineer of the Belfast and Northern Counties Railway Company, Ireland. He was engaged in his early manhood in the construction of the Tunbridge Wells and Hastings line, under the contractors for that section of the South-Eastern Railway, Messrs. Warton and Warden. In 1855 he obtained the appointment of Engineer to the Londonderry Port Harbour Commissioners, and held subsequently the position of Engineer to the Londonderry Coleraine Railway, and upon the acquisition of that railway by the Belfast and Northern Counties Company, in 1871, that of chief engineer of the whole of the latter company's system.

At a special meeting of the Preston town council, held on Friday, it was decided to pay Mr. T. W. Walker, the contractor for the suspended Ribble Navigation Works, the sum of £34,572 19s. 6d., being the retention moneys in the hands of the corporation.

A new Masonic hall was opened on Saturday at Derrigahy, Milltown, co. Antrim. It has been built by Messrs. D. and P. M. Henry, of Belfast.



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## ILLUSTRATIONS.

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PRIORY, BELMONT.—PROPOSED NEW RESIDENCE AT  
NOTTINGHAM.—WARDEN'S LODGE, DAVENTRY  
GRAMMAR SCHOOL.—BANKING PREMISES AT SKIPTON  
AND AT DONCASTER.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## ST. MARK'S, VENICE.

THIS world-famed masterpiece of Byzantine architectural skill is too familiar to need any lengthy description here by way of introduction to the photographic illustration which we give to-day. The view shows the north side of the nave and transept, with its isolated dome, one of the five golden domes which crown the cathedral. Who the architects were who designed St. Mark's is unrecorded, and, indeed, it remains a vexed question whether they were Greeks or Italians; but the architectural detail of the fabric undoubtedly indicates an Eastern or Arabic influence, while the Lombardic character of some of its later decorations is indisputable. The columns which enrich the building number no less than five hundred, some being in the finest African and Greek marbles, porphyry, and verde antique brought from older buildings, and everywhere the round arch predominates. The walls, both inside as well as out, are encrusted, too, with marbles and mosaics, with the floors of marble and porphyry tessellation, varying in scale from the most vast slabs to the finest mosaic work, glowing in Oriental colours and magnificently enriched with sculptures, every foot of this wonderful church being, in fact, a precious work of art. Signor Ferdinando Ongania, of Venice, lately published a series of portfolios containing details in chromo-lithography and photogravure of "La Basilica di San Marco in Venezia," and some of these grand illustrations of the cathedral are now being exhibited in the Italian Exhibition at West Kensington. Nearly every style of art is represented either in the architecture or the decorations of this building, which, although at first only the court chapel of the Doge, soon exercised an extensive influence on the national taste and styles. The Patriarchate was in 1807 removed from San Pietro to St. Mark's, which was thus constituted the cathedral of the city, and the Venetian Government has annually appropriated a certain sum to its restoration and maintenance. The origin of St. Mark's is doubtful, but in 552 a chapel to St. Theodore had already been erected on the site by Narses, the Greek captain. In the 9th century more reliable data tells us that the body of St. Mark was brought by Venetian citizens from Alexandria, when the jubilant people deposited their former patron saint, and his chapel, just referred to, was incorporated in the new church of St. Mark. Doge Giustiniano Partecipazio began this greatly developed work, and his brother, Giovanni, finished it. The building was, however, destroyed by fire in 977, and the saint Doge Pietro Orseolo commenced to rebuild the church on a much grander scale on the model of the church of the Apostles at Constantinople, and furnished the funds out of his own treasury. The work was continued by his successors, among whom Domenico Con-

tarini should be mentioned for his zeal in this respect (1043), but nearly a hundred years had elapsed before the fabric was completed (1071) under Domenico Salvo. This Doge decorated it with the costliest marbles, and during his reign the mosaics were commenced. In 1094, under Vitale Faliero, the cathedral was solemnly dedicated. The consecration took place on Oct. 4, 1111, in the time of Ordelafo Faliero. The Byzantine leafage of the capitals of the columns in St. Mark's are nearly identical with many at Constantinople, and it is interesting to note that the church of St. Froude at Perigueux in the centre of France was at about the same date erected by Venetian merchants in direct imitation of St. Mark's at Venice, thus commencing probably the class of forms classified by Violett le Duc as the "Gallo-Romaine," in order to distinguish them from the Romanesque works found side by side with them. St. Mark's, indeed, furnishes the link between the Byzantine style and the churches of Aquitaine, and through them to our own Romanesque and Transitional works. Similar semi-classical details, contemporary with St. Mark's, are to be seen in one of the portals of the cathedral at Mayence, having columns crowned with Corinthian capitals and thick impost mouldings. Very similar, too, is the architecture of the church of the Holy Theotokos (or Mother of God) at Constantinople, which differs, perhaps, very little, too, in point of date, from St. Mark's at Venice. That church, however, has but one dome of any importance, though there are several minor ones over the narthex. The principal dome covers the intersection of the barrel vaulting at the crossing, and is supported by four columns. St. Mark's, on plan, is that of a Greek cross, consisting of a group of five squares, each of which is covered by a pendentive dome. Its peculiarity lies in the breadth of the strips of wagon vault which support and separate these domes, which is so great that the vast piers which sustain them are pierced in two stories, and divide each other into four piers, with a vaulted space between them. Each dome is, consequently, the centre of a cruciform space, the wings of which have wagon vaults. The only exception is the east end, where the apse is substituted for this space, and out of this apse, as at St. Sophia, spring three minor ones with columns between. Each dome is about hemispherical above its pendentives, and is pierced with lights like those at St. Sophia. Lofty timber domical towers rise over the exterior of these domes, and terminate in a sort of Oriental turret at the apex. In Sir Gilbert Scott's lectures on Mediaeval Architecture, delivered before the Royal Academy (Vol. II, p. 265), a plan and section of the cathedral is given from Ferguson, with a cross-section of one of the domes in detail. The wings which flanked each domed space, bounded as they were by the perforated piers, were so suggestive of side aisles that the builders, familiar, no doubt, with aisled churches, added arcades from pier to pier, both in the nave and in the transepts. These, however, are merely decorative, supporting no galleries, as is frequent in the East, and only serving as narrow communications, equivalent to triforium passages, between the upper chambers in the great piers. The decoration of the interior is no doubt a joint imitation of St. Sophia's and the Apostles' Church, as already mentioned, imitating the latter in its plan and rivaling the former in its sumptuous elaboration. The church suffers internally from a want of light, and in spite of the brilliant rays of a southern sun, the church always is seen in a sort of gloom. Sir Gilbert Scott's plan of the cathedral was given in the BUILDING NEWS for April 4, 1873; and a perspective view of the west façade in our issue of Dec. 19, 1879.

## BIRMINGHAM NEW POST-OFFICE.

We gave elevations, sections, and plans of this building in our issue of June 8 last, and now supplement them with details. The building, which has been recently commenced, is from the designs of Mr. Henry Tanner, of H.M. Office of Works, and the builder is Mr. Vickers, of Nottingham.

## MEMORIAL CHAPEL TO THE LATE ARCHBISHOP VAUGHAN.

THIS chapel is to be built in memory of the late Archbishop Vaughan, and will form the

north transept to the Pro-Cathedral, St. Michael's Priory, Belmont, near Hereford. At the west side will be placed the tomb, and on the east side an altar will be erected to St. Bede, who was the patron saint of the late archbishop. Messrs. Pugin and Pugin, of Westminster, are the architects of this and the whole group of buildings. The estimated cost is about £2,000. A ground plan and double-page perspective of the Priory and Pro-Cathedral buildings, as proposed to be completed, was published in the BUILDING NEWS for April 12, 1878; and the memorial tomb of the Right Rev. Thomas Brown, O.S.B., first Bishop of Newport and Menevia, which has been placed in a chantry chapel of the Pro-Cathedral, in our number for Nov. 7, 1884.

## PROPOSED NEW RESIDENCE AT NOTTINGHAM.

THIS house is designed for a somewhat cramped site in a pleasant part of Nottingham, and its general arrangement may be seen by a glance at the key plan. It contains hall, dining, reception, and business rooms, kitchen and kitchen offices, and six bedrooms. The materials used are Bulwell rock-faced stone and local red bricks for the walls, the wrought stonework being blue Handsworth. The external woodwork is oak. The ground floor walls are panelled in wainscot, and the reception-room contains an angle. The cost, when completed, will be about £1,900. The illustration is taken from a drawing by the architect, Mr. Arthur Marshall, A.R.I.B.A., Nottingham.

## WARDEN'S LODGE, DAVENTRY GRAMMAR SCHOOL.

THIS building, now approaching completion, is intended as an addition to the present grammar-school to accommodate the rapidly-increasing number of boarders. It is pleasantly situated on the outskirts of the town, and near the present buildings. The whole front is faced with red sand brick, the ornamental features being carved in Messrs. Lawrence's rubbers. The roof is covered with red Brosely tiles. The builders are Messrs. J. Parnell and Son, of Rugby, and the architect is Mr. Norman M. Brown, A.R.I.B.A., of Leicester.

## COMPETITIONS.

CLAPHAM PUBLIC LIBRARY.—The award in this competition of the work to Mr. E. B. T'Anson, and the second place and a honorarium of £10 (which, however, was refused) to Mr. J. J. Jones, has given rise to much angry discussion in the daily and local newspapers. One journal says "the Commissioners have employed the solicitor to the vendor of the library site as their secretary; they have accepted the design of the surveyor to the vendor of the ground as their architect, although his measurements were wrong and his price excessive, and if report be true they have engaged the builder on the same vendor's estate as the contractor for the library. Hence the Bowyer Manor Estate has furnished the Commissioners with a plot of ground, a secretary, an architect, and a contractor—all from its own office." "Keruba," writing in the *Echo*, stated that the selected plan omits a basement, affords facilities for the multiplication of extras, and further that "the Commissioners who chose the plan by the surveyor to the Bowyer estate comprise two clergymen whose livings are part of the property of the vendors (the Bowyer estate), the solicitor to the same estate, the two churchwardens to the parish church (the living of which is in the gift of the Bowyer family), and four vestrymen." In reply, "Abuker," writing in Tuesday's *Echo*, admits that the original measurement of the site as shown on the plan sent out to competitors was incorrect, but says it was "more than compensated for by the vendors conveying to the Commissioners an additional piece of ground. 'The plan chosen,' 'Abuker' adds, 'is perfectly workable, does not omit a basement, and does not afford an absolute necessity in this case, facilities for the multiplication of 'extras' later on. The solicitor to the vendors is not one of the Commissioners; and, notwithstanding the insinuations of your correspondent, the whole of the Commissioners are gentlemen and men of honesty and integrity.'









BANKING PREMISES, DONCASTER, for the YORKSHIRE BANKING CO. LD. F.W. Masters, Architect









THE BUILDING NEWS, AUG. 31. 1888.







"PHOTO-TINT", by James Akerman © Queen Square, London, W.C.

S · MARKS · VENICE



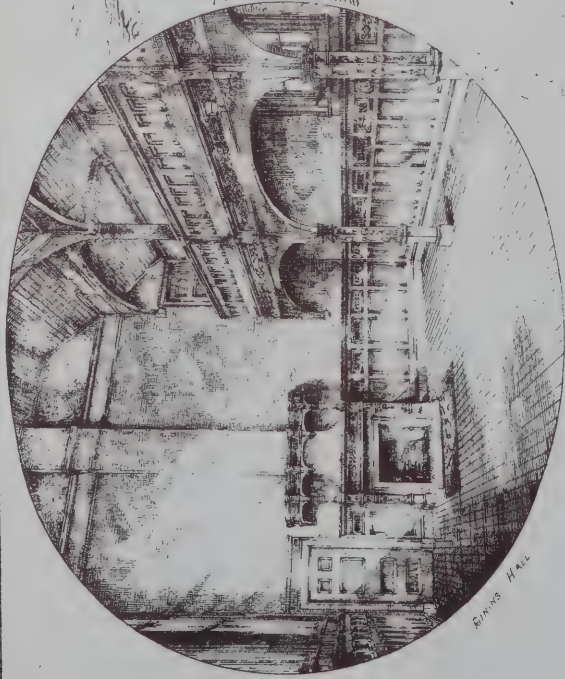




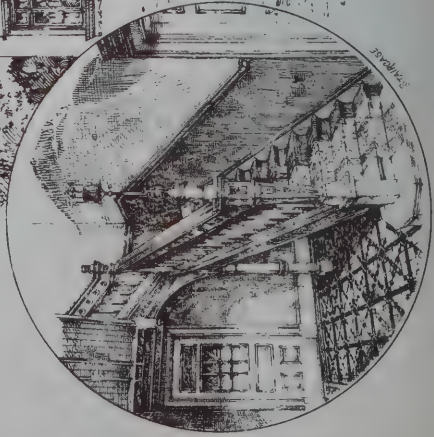




# THE BUILDING NEWS, AUG. 31. 1888.



Reading Hall



Reading Hall



Floor Plan



Norman M. Brown, A.R.B.A.  
Leicester  
Architect

Photo-Lithographed & Printed by James Alderman, 6, Queen Square, W.C.



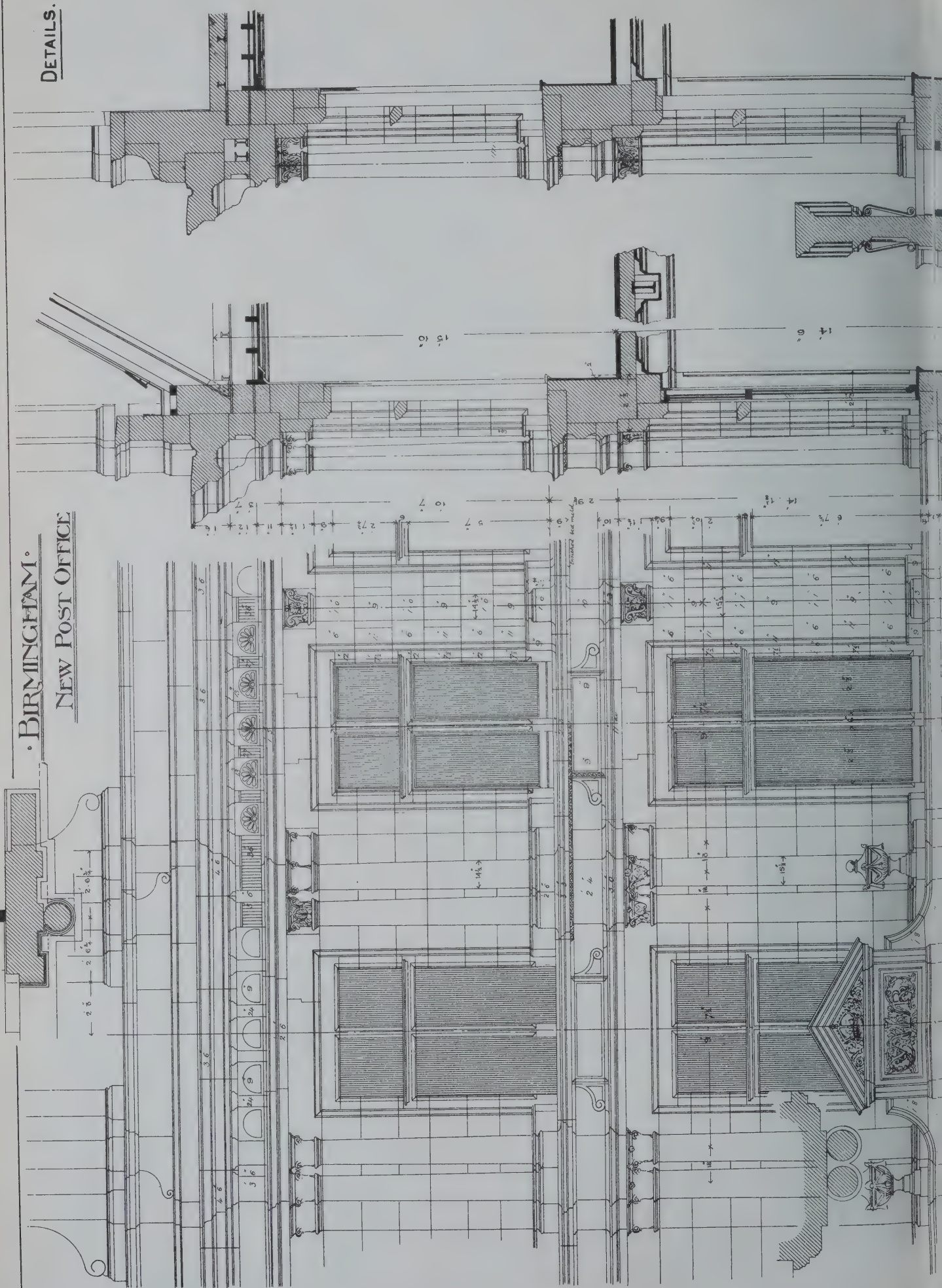




• BIRMINGHAM •

NEW POST OFFICE

DETAILS.



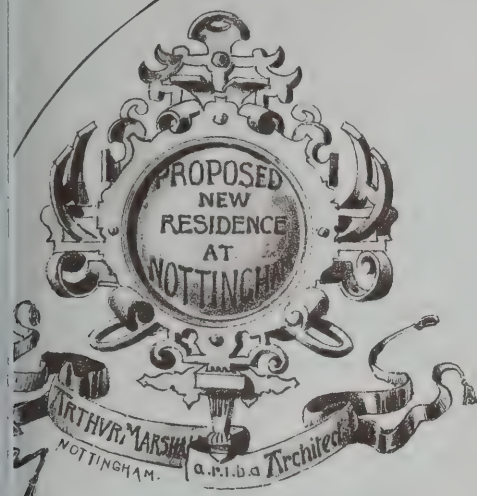




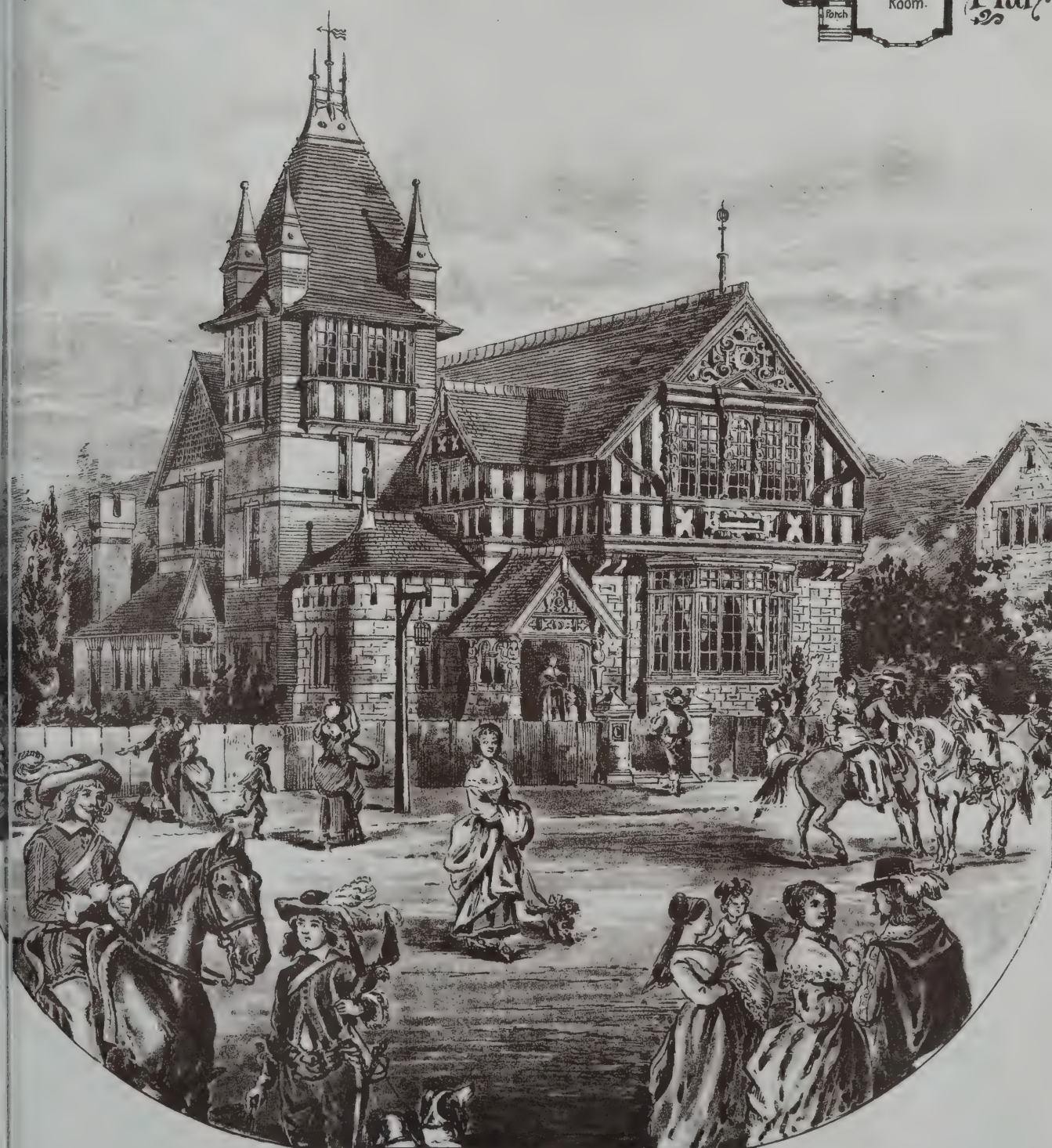








Plan.



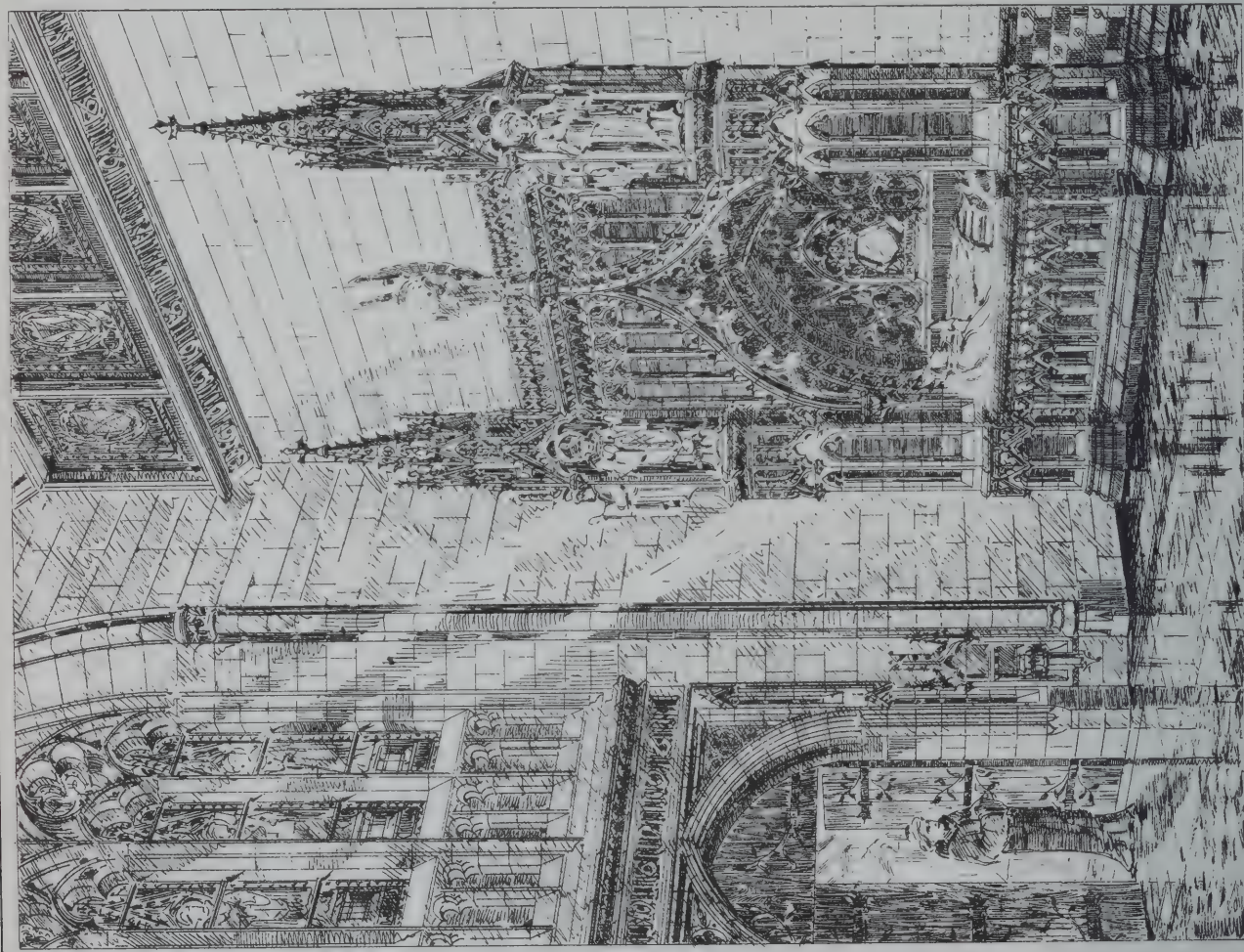




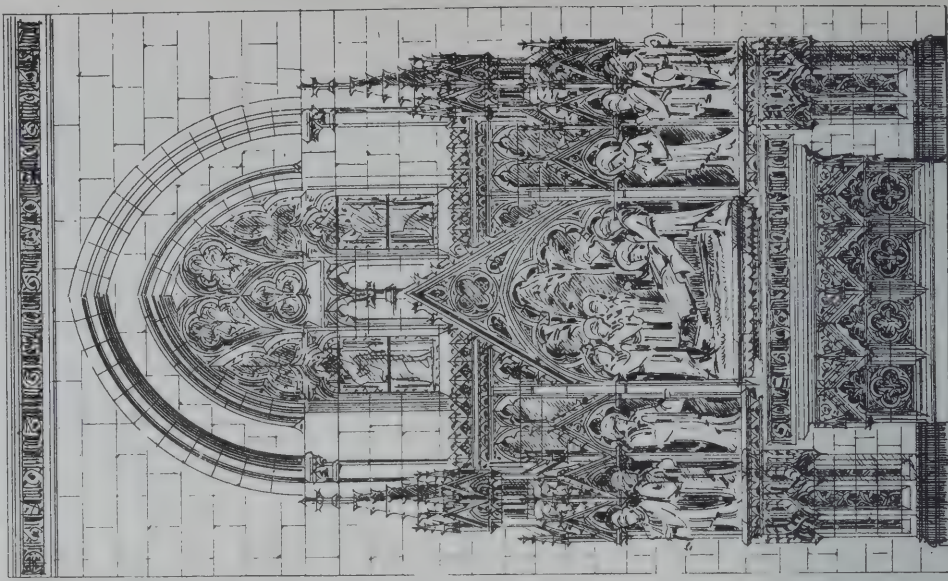




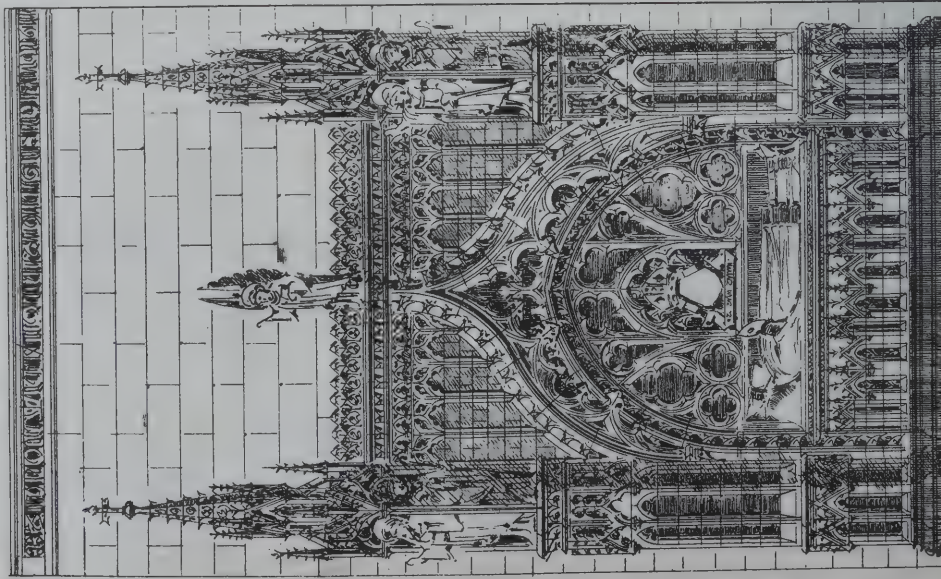




View of Tomb



Elevation of Altar



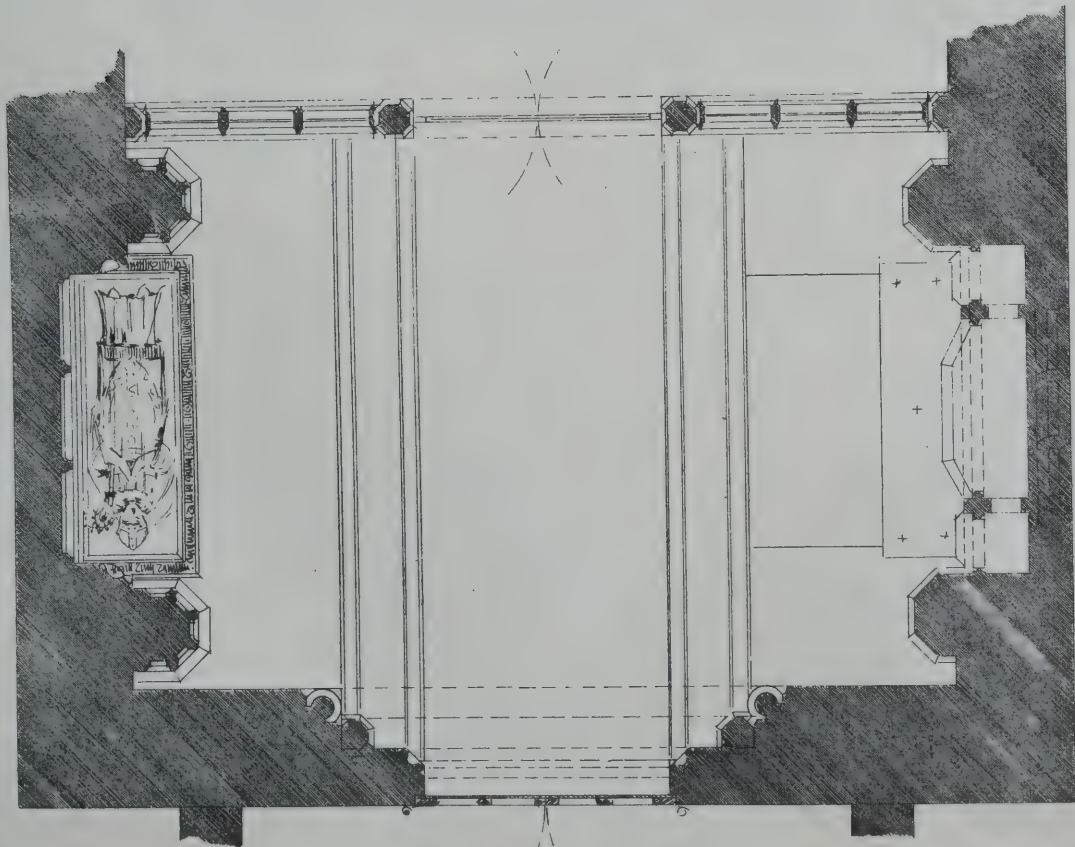
Elevation of Tomb



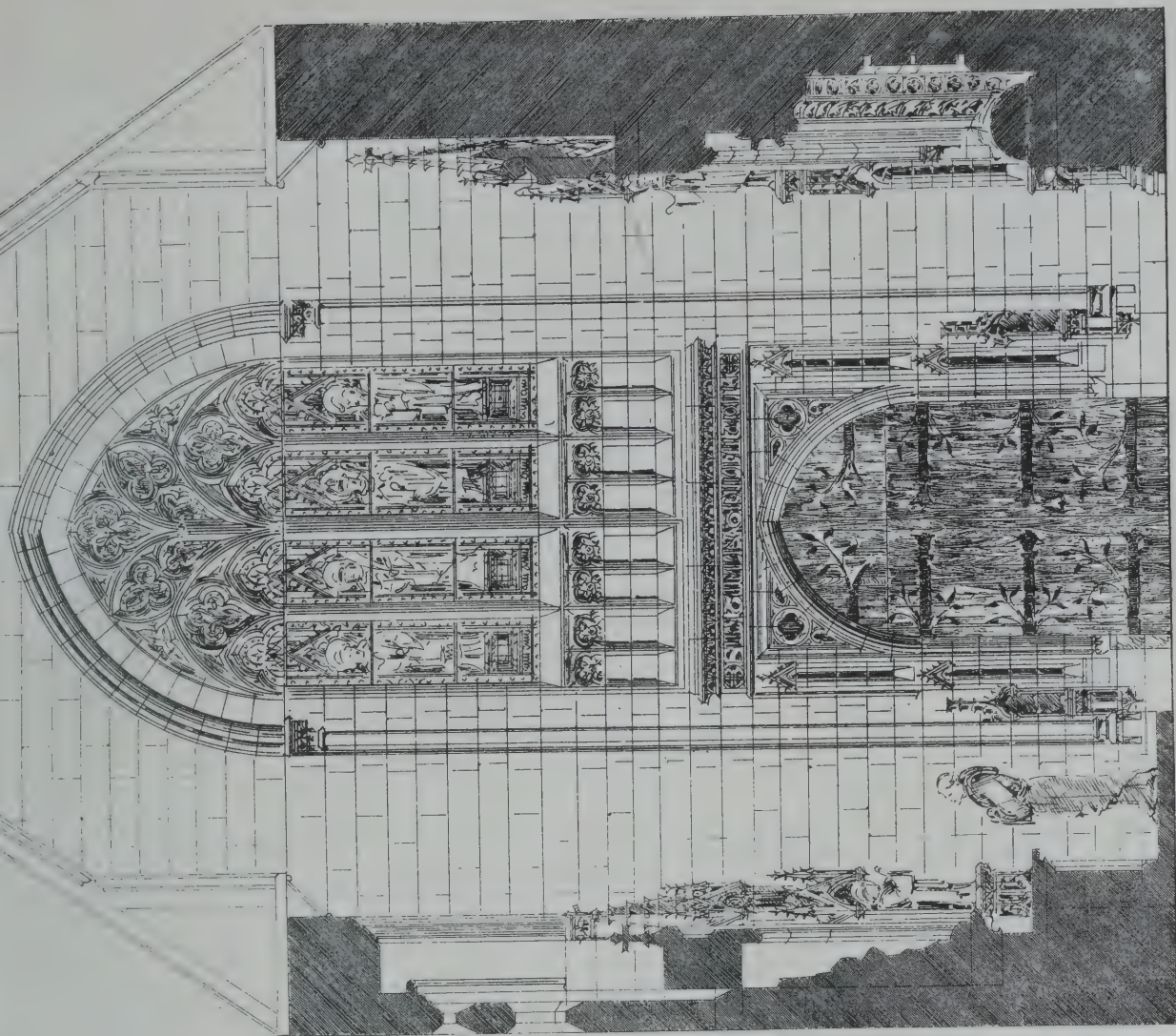
London. 1880.

rested in appearance among of its kind. The building is a masterpiece of architecture.

at St Michael's Priory, Belmont  
Herefordshire, England



Plan



Elevation of Entrance









W. BANKING PREMISES, SKIPTON, YORKS. for the YORKSHIRE BANKING CO. LIMITED.

Fred W. Masters, Architect.





## POLISHING GRANITE.

THE form is given to the stone by the hands of skilled masons, in much the same way as is done with other stones of softer nature. Of course the time required is considerably greater in the case of granite as compared with other stones. If the surface is not to be polished, but only fine-axed, as it is called, that is done by the use of a hammer composed of a number of slips of steel of about a sixteenth of an inch thick, which are tightly bound together, the edges being placed on the same plane. With this tool the workman smooths the surface of the stone by a series of taps or blows given at a right angle to the surface operated upon. By this means the marks of the blows are given obliquely on the surface of the stone are obliterated, and a smooth face produced. Polishing is performed by rubbing in the first place with an iron tool and with sand and water. Emery is next applied, then putty with flannel. All plain surface and moulding can be done by machinery, but all carvings, or surfaces broken into small portions of various elevations, are done by the hands of the patient hand-polishers.

The operation of sawing a block of granite into slabs for panels, tables, or chimneypieces is a very slow process, the rate of progress being about half an inch per day of ten hours. The machines employed are few and simple. They are technically called lathes, waggons, and pendulums or rubbers. The lathes are employed for the polishing of columns, the waggons for flat surfaces, and the pendulums for moulding and such flat work as is not suitable for the wagon. In the lathe the column is placed and supported at each end by points, upon which it revolves. On the upper surface of the column there are laid pieces of iron, segments of the circumference of the column. The weight of these pieces of iron lying upon the column, and the constant supply by the lathe-attendant of sand and water, emery or putty, according to the state of finish to which the column has been brought, constitute the whole operation. While sand is used during the rougher state of the process, these irons are bare; but when using emery and putty, the surface of the iron next to the stone is covered with thick flannel.

The wagon is a carriage running upon rails, in which the pieces of stone to be polished are fixed, having uppermost the surface to be operated upon. Above this surface there are shafts placed perpendicularly, on the lower end of which are fixed rings of iron. These rings rest upon the stone, and when the shaft revolves they rub the surface of the stone. At the same time the wagon travels backwards and forwards upon the rails, so as to expose the whole surface of the stone to the action of the rings. The pendulum is a frame hung upon hinges from the roof of the workshop. To this frame are attached iron rods, moving in a horizontal direction. In the line upon which these rods move, and under them, the stone is firmly placed upon the floor. Pieces of iron are then loosely attached to the rods, and allowed to rest upon the surface of the stone. When the whole is set in motion, these irons are dragged backwards and forwards over the surface of the stone, and so it is polished. When polishing plain surfaces such as the needle of an obelisk, the pieces of iron are flat; but when we have to polish a moulding we make an extra pattern of its form, and the irons are cast from that pattern.—*The Stonemason.*

## CHIPS.

A new mission hall is about to be built in the Grove, Southwark. Mr. John Groom is the architect, and Messrs. W. and H. Castley, of Redcross-street, are the contractors.

Mr. J. Thornhill Harrison, Local Government Board inspector, held an inquiry at Acocp's Green, near Birmingham, on Friday, into an application made by the Solihull rural sanitary authority to borrow £2,800 for works of sewage at Yardley. The surveyor to the rural authority produced and explained the plans.

Two figures representing St. Paul and St. Wilfrid were placed on Saturday at the base of the reredos of St. Nicholas's Cathedral, Newcastle-on-Tyne, the work of Mr. J. Sherwood Westmacott. There are still ten figures to be placed in the centre of the reredos. A series of the statues were illustrated in the BUILDING NEWS for Jan. 6 of the present year, and the reredos itself in our issue of May 25 last. The interior of the choir, as restored by Mr. R. J. Johnson, F.S.A., was given in the number for Nov. 11th, 1887.

The magistrates of Longton, Staffs., granted a license for the new Queen's Theatre in that town. The new theatre, which is situated in Commercial-street and Chancery-lane, has been erected from the plans of Mr. John Taylor, architect, Longton, by Mr. T. S. Bromage, of Longton, the contract price being £12,000. Accommodation is provided for 3,000 persons.

## Building Intelligence.

BIRMINGHAM.—Three gifts to St. Philip's Church were completed on Saturday. They consist of two stained-glass windows placed in the north-east and south-east apsidal corners of the chancel, and a new font standing in the baptistery at the west end of the church. The new windows were designed by Mr. E. Burne Jones, R.A., and made by William Morris and Co. They form companion pictures to that in the east window, which is by the same artists, and the subject of which is the Ascension. The window on the north-east represents the Nativity, and that on the south-east the Crucifixion. The two new windows cost about £700 each. The new font stands on a pediment of Portland stone. Under the bowl is a richly carved pedestal of Pavonazza marble, and of square section. The capital of the pedestal is of alabaster foliated, and supports the bowl, which is a fine block of polished Mexican onyx. This massive vessel is formed out of one of the largest slabs of onyx imported into this country. The font, which has cost about £150, was designed by Mr. J. A. Chatwin, who carried out the enlargement of the chancel, and the work was executed by Mr. Robert Bridgeman, of Lichfield.

BRIXTON.—A tower and spire are being added to the fine church of St. John the Evangelist, Vassall-road, Camberwell New-road, erected fourteen years since, from the designs of the late Mr. G. E. Street, R.A. The church, which is said to have been regarded as the *chef d'œuvre* of his ecclesiastical structures, has already cost upwards of £20,000, and internally is still unfinished. The tower will be 25ft. square at the base, and the foundation walls are carried to a depth of 10ft. below the ground line. This portion of the structure will be 108ft. in height from the ground line. It is faced with red brick 2in. in thickness, specially manufactured for the occasion, with Bath stone for dressings and ornamentation, and will be uniform with the church in its features. At each angle massive buttresses, having ornamental stone capitals, are being carried up to within a few feet of the cornice. On each side of the lower portion of the tower there is a central window 28ft. high. The upper portion is intended to be fitted for a peal of eight or ten bells. The spire, entirely faced with stone, will rise to a height of 104ft. above the tower, the entire height of the structure, from the ground line to the apex of the spire, being 212ft. The bell loft will be reached by a winding staircase at the north side of the tower, in which it is proposed to place an illuminated clock with chimes. Mr. Arthur Edmund Street, M.A., is superintending the carrying out of his late father's designs, and Messrs. Dove Brothers are the contractors.

GULLANE, N.B.—A new Episcopal church in the village of Gullane, East Lothian, was opened on Sunday. It adjoins the ruins of a Norman church which has been disused since the Reformation, and is of the same character. Mr. John Honeyman, architect, Glasgow, was the designer of the new chapel. It consists of a nave and apsidal chancel—the chancel arch being a reproduction, on a slightly enlarged scale, of that in the old kirk. The chancel of the chapel is lighted by three small round-headed windows. The erection of the bell tower will be delayed until sufficient funds are available. Measuring 71ft. (including apse) by 29ft., the nave of the new church will hold 250 people, who will be accommodated with chairs instead of pews. The pulpit, which is placed in the north-east corner of the church, near the arch, is at base of white freestone, with the upper part of oak. The walls of the church inside and outside are faced with dressed freestone. The contractor for the mason work was Mr. George Blair, Belhaven, Dunbar; and for the other parts Messrs. Binnie and Scott, Edinburgh. Including the boundary wall, the whole cost will not much exceed £800.

PLYMOUTH.—In pursuance of the scheme for the reconstruction of the Plymouth Market, another block of buildings has just been completed and will very shortly be occupied. Both sides of the proposed new road through the

market connecting Tavistock-street with Cornwall-street are now flanked with blocks of new market buildings. The width of the road 40ft., with asphalted footway in front of the new block 8ft. wide. The ground plan of the entire market provides for this road as a public thoroughfare. The block just completed constructed in the same style as the other new sections. Mr. C. King is the architect, and Messrs. A. R. Lethbridge and Son, of Truro Building-yard, Plymouth, are the contractors. The cost of the work having been about £3,100. The clerk of the works was Mr. S. Stanbury. There are eleven shops in the block, the average inside measurements of each being 19ft. by 15ft. 3in. The height of the shops which occupy the ground floor is about 12ft., while the upper rooms have a similar area to the shops, but an average height of 11ft. Lime stone piers with granite bases divide the shop and support the upper part of the building. Messrs. Goad Bros., Plymouth, have supplied the piers, and Mr. Storey, of Calstock, the granite. The front of the block and the chimneys are of Fareham bricks, and the roof of Delabole slate, supplied and fixed by Mr. S. Roach, Union-street. A liberal use of terra cotta has been adopted, the material being supplied by Messrs. Monk and Newell, of Ruabon. The whole of the ironwork has been supplied by Messrs. Allan and Son, of Glasgow.

RIBBLETON.—Mr. W. E. M. Tomlinson, M.P., laid last week the corner stone of a new church at Ribbleton, near Preston, to be dedicated to St. Mary Magdalene. Only the nave of the church and the lower part of the tower are at present in hand. The walls will be built of Yorkshire parpinto, and all the stone dressings will be of red Rainhill stone. The interior walls of the church will also be built of Rainhill stone up to the window sills, and the chancel and tower arches are to be of the same material. The style is of the Decorated period and the tracery of each window will be varied. Mr. R. Knill Freeman, of Bolton, is the architect, and the contractors are Messrs. George Wood and Son, of Bootle.

STOCKLAND.—The parish church of St. Michael, Stockland, Devon, was reopened on Tuesday week, after restoration. The church has been entirely resseated with the exception of the chancel, the north chancel aisle, and the west gallery in the tower. New floors under the seats have been put throughout, formed of solid wood blocks laid herring-bone wise on a bed of concrete, with a thin layer of Portland cement under the blocks. Moulded open benches of pitch pine, left clean from the tool, take the place of the high pews which boxed in and hid the proportions of the nave piers and bases. The bases have been repaired where formerly mutilated in the erection of the old pews. The heavy prayer-desk in the nave has given place to small desks fixed on ornamental brackets to the chancel seats on the north and south side for the officiating clergy. The central passage between the chancel seats has been widened, and the whole of the chancel laid with encaustic tile paving specially designed by the architect, and manufactured by Messrs. Godwin and Son, of Lugwardine, near Hereford. There is a new altar railing of oak supported on wrought iron standards. The altar also has been heightened and lengthened, having been of insufficient dimensions. The reredos and pulpit, being out of character, have been removed. The south transept, or "Ford Pew," has had its floor lowered to the same level as the nave. The font has been refixed in the centre of the ground story of the tower, on a Keinton stone platform, and will have an ornamental flat font cover clasped with wrought ironwork. Two underground chambers have been formed, with gratings over, for Porritt stoves. The ancient external doorway and door at the east end of the church have been opened out and restored. The south porch is being opened out and repaired, the original external arch restored, a new oak ceiling (copied from the present one, which is decayed) provided, and new doors erected. The works have been carried out under the superintendence of Mr. B. Edmund Ferrey, F.S.A., of 15, Spring-gardens, London, S.W. Mr. W. T. Berry, of High-street, Honiton, was the contractor.

UPEXE, REWE.—The ancient chapel of ease at Upexe, in the parish of Rewe, Devon, was



ned on Saturday after restoration, from by Mr. R. Medley Fulford, of Exeter; rs. George Short and Son, of Silvertown, mpton, being the contractors. The build- chiefly of Early English character, with Decorated additions and insertions, and been used as a dwelling for two families cottagers for several generations. In re- ing it for purposes of worship, it has been ight sufficient to renovate the solid parts e chapel, and only gradually incur the of furniture. The building, which was in y dilapidated condition, was constructed iltonton stone, and the new stone has been lited from a quarry at Killerton by Sir nas Acland. The copings are constructed Ham Hill stone, as well as the bell turret the cross at the eastern end. The chapel een fitted with a roof of pitch-pine in the ic style, and an outer covering of tiles a the firm of Messrs. Exley and Son, of eley. The floor has been laid with con- e, while the space outside the altar rails has e fitted with mosaic tiles, supplied by rs. Wollisroft and Son, Hanley, Staffs. windows have been filled with stained s. The expense so far incurred is about 0. A vestry will be added at once to the ding on the northern side, and this, with construction of ventilators, will increase expenditure to £400.

WALTHAMSTOW.—The Prætorian Avenueools have recently been erected for the Walthamstow School Board, from the designs under the superintendence of the architect, W. A. Longmore, of Prospect-hill, the dding works having been carried out by rs. Green and Lee, builders, of Antonet Works, Hackney. The schools accommo- 380 boys, 360 girls, and 410 infants—total, 0, the amount of the contract being £8,000, about £7 per head. The school buildings constructed in a most approved manner h solid block flooring to the rooms and ent stone paving to the corridors. The oes are finished with Keene's cement and nted. The ceilings of match-boarding, wing the ornamental principals of the roofs, all the woodwork, except the windows, ned and varnished.

WALSHAM, LANCs.—The contracts for the eral works required in the erection of the e Haworth Memorial Church, between Walsham and Lower Croft, have been let to rs. S. Hobson, of Rawtenstall, and John ith and Sons, Thomas Cornall, and John y and Sons, of Bury, and building operations e been commenced. The accommodation is nally for 550 worshippers, but the space eeen the benches is much greater than that ally allowed. The nave is 46ft. wide in- nally, and roofed in one span; arcades on h north and south sides divide the area so as provide approaches along the wall sides. At e eastern end of the nave are transepts ided by a double arcade from the nave. On e south side of the chancel is a memorial el and a clergy vestry, occupying the und floor of the tower. To the north of the ncel is situate an organ chamber over a choir y. The style adopted is Geometrical thic. The principal external feature is the ver, which, together with the octagonal spire, es to a height of 160ft. The west gable is nked by octagonal turrets, and has for a utral feature a seven-light window, 34ft. in ight. All the external stone, both for walls d dressings, is from the Holcombe quarries, d that for the interior from Cullingworth. The ifs are covered with Buttermere green slates, d are double boarded. The chancel has an aded dado of stone, and a reredos, 20ft. in ight, of stone and marble. The pillars of the ve arcades are of polished granite; the floors e passages, porches, and chancel are paved h tiles and mosaic, and the others with oden blocks laid on concrete. The walls of ve and transepts have a dado of Ruabon lcks, with bands of celadon bricks at inter- ls, and a capping of terracotta. The roof bers are of pitch pine, wrought where seen; e open benches are of the same material.

Prof. Hauser, while engaged on superintending e excavation of the Roman station at Carnatum, e Danube, near Vienna, has discovered in nfield the site of an amphitheatre, which is parently in a good state of preservation.

## ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION AT GLASGOW.—The British Archæological Association opened their forty-fifth annual congress at Glasgow on Monday. The Lord Provost held a reception in the Corporation Hall, when Mr. John Honeyman, F.S.A., F.R.I.B.A., president of the local society, welcomed the members. The congress then visited Langside, unveiling a new stone monument commemorative of the death of Mary Queen of Scots, erected on the battlefield. They afterwards visited the cathedral, where Mr. Honeyman acted as guide, and read a paper on the architectural features of the building. On Tuesday the members visited Bothwell and Craignethan Castles, Lanark, and the Falls of the Clyde, and on their return an address was given by the President, the Marquis of Bute, in the Merchants' Hall. On Wednesday visits were paid to Torwoodhead Castle and the Tapoch Broch, which were described by Mr. J. Dalrymple Duncan, and the battlefield of Bannockburn and the antiquities of Stirling, where Mr. W. B. Cook acted as guide. At the evening meeting, papers were read by Archbishop Eyre, Professor Veitch, Dr. Collingwood Bruce, and Mr. Allan Wyon, Chief Engraver of Her Majesty's Seals.

SOMERSET ARCHÆOLOGICAL SOCIETY.—The annual meeting of this society, which is held this year at Wells, was opened in the town hall of the city on Tuesday. The Bishop of Bath and Wells (Lord Augustus Hervey) presided. The annual report stated that the membership is increasing, and is now 530, and that the financial condition of the society is also satisfactory. An address was given by the president. Afterwards the members visited the palace, which was described by Mr. Henry Buckle, and the Close Gates, an evening meeting being held in the evening. On Wednesday an excursion was made to Rodney Stoke and Cheddar, and in the evening papers were read and discussed at the town hall.

## ARCHÆOLOGICAL.

DISCOVERY OF PREHISTORIC GRAVES IN ROSS-SHIRE.—On Friday last, on Drummond farm, in the parish of Kiltarn, Ross-shire, an ancient grave was opened in the presence of Sir Hector Munro, the owner of the property. A similar grave had been opened ten days before in the same place, and in both instances the skeletons were found pretty entire. The mound in which the graves occur is a natural accumulation of gravel and sand, formed by the river Sgiach, which flows close by. There are four such mounds in the field, that in which the coffin-pits in question occur being about 20ft. high and about 40 yards long. Its length lies almost due north and south. The dimensions of these coffin-pits or cisterns are similar—3ft. 3in. by 2ft., and depth 2ft. The grave-lining in both cases is formed of large undressed red sandstone flags, and two or three flat boulders of gneiss, all found in the neighbourhood. In the southern or more primitive grave was found, besides the skeleton, an urn of coarse clay containing black ash, but nothing else. In both graves the skeletons were seen in bold relief against the bottom of the coffin-pit with their faces to the east. The knees were drawn up and the hands placed on the cheeks. The urn, with its contents, is in the possession of Sir Hector Munro, and will be preserved at Fowlis Castle.

A new organ was opened on Tuesday at a festival service in Kirkby Stephen parish church. The organ was built by Mr. J. Abbott, Leeds, and planned by Mr. Walker Joy, of Harrogate, with oak screen, designed by Mr. Norman Shaw, R.A., London.

Mr. John Brownrigg, builder and contractor, of Bowness, went on Friday to the top story of a house in course of erection and struck his head against a piece of woodwork. This caused him to fall from the gangway he was standing on to the basement, and death ensued shortly afterwards. Mr. Brownrigg was one of the oldest members of the local board.

The parish church of Horwich, near Manchester, was reopened on Friday after being decorated internally, a work carried out by Messrs. E. Goodall and Son, of Manchester.

## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of eight words, the first line counting as two, the minimum charge being 6s. for four lines.

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## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

## NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., LI., LII., LIII., and LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print. Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—M. H. and Co.—J. K. and Co.—C. and Co.—T. P. C.—G. B. J.—S. Bros.

J. D. and Co. (Go to a good firm like Braby and Co., Easton-road, or The London Galvanised Iron Co., Wharf-road. Don't buy cheap rubbish.)—R. B. (Very likely; send and we will see.)—J. VINCE. (J. C. Edwards, of Ruabon, or the Burmantofts Co. Avoid the firm you mention.)—A. ROBINSON. (No good—don't trust them.)—L. (Marion's ferro-prussiate paper is what you want. See advt. on front page.)—H. HUDSON. (Not the same companies—the one in Great George-street is the one we recommend.)—TERRACOTTA. (You pay for a name of course there as well as at other places. Plenty of small people do good work, but they don't seem to think it worth while to make themselves known. Nine-tenths of the makers of building goods seem to think architects have nothing to do but walk about looking for novelties; the sensible tenth recognise the fact that it is their business to make themselves known to architects, and so make money.)

## Correspondence.

### SOCIETY OF ARCHITECTS—POSTPONE- MENT OF THE CARDIFF VISIT.

To the Editor of the BUILDING NEWS.

SIR,—The Council greatly regret that, owing to local arrangements of which they have only now received information, it has become necessary to postpone the visit to Cardiff till next year. They regret this the more as the gathering promised to be the most successful yet undertaken, but trust that there will be a large attendance when it is eventually arranged.—I am, &c., G. A. T. MIDDLETON, Secretary.

St. James's Hall, Piccadilly, London, W., August 29th.

## STRAINS.

SIR,—As Mr. Middleton, in your issue of the 17th inst., still asserts the correctness of his new version of vertical shearing stress, I will try and prove to him the fallacy of his reasoning, and at the same time explain "the theory to which Col. Seddon pins his faith."

In his reply to my letter, which appeared in





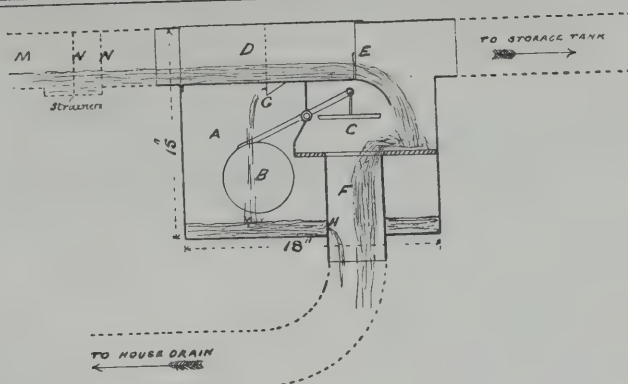


AUG. 31, 1888.

quantities. Indeed, short quantities would be the order of the day, for what advantage would be gained by accuracy when all the work was to be measured, while by keeping the quantities short the owner would be the more easily got into it." Then, indeed, there would be what a high time for surveyors as well," as of course they would get their 1 or 1½ per cent. on the "quantities" without any fear of "niggling over half-inches, squabbling over the girth of this moulding or projections of that cornice," or Scotch "probable" quantities would do as well as the most correct; so that, "in these days of close competition and cutting prices," the services of the quantity surveyor might possibly be dispensed with in the first instance, which probably Mr. Stone did not contemplate. But even so, he would, in any case, get his 1½ or 2½ per cent. for the admeasurement of all the works at the completion, when no doubt he deferred niggling and squabbling would come off with cumulative force. Still, the surveyor would then be "cock of the walk" and master of the situation, and the architect would have the honour and glory of signing his name and giving his certificate for the amount really decided by the surveyor, either "long or short," as he may be disposed to yield to or resist the "Argus eye" of the contractor. There can be no more safeguard against errors in "measuring up" work one than in "taking off" quantities from drawings; the disturbing influences are more pressing and immediate, and the difficulty of getting at facts much greater. Still, the result would probably be that smart builders, with "Argus eyes" and persuasive ways, would be better paid, and of course, the surveyor's and the architect's fees would be higher, although owners might become rusty, and vow with angry explosion or sullen silence to steer clear of architects, surveyors, and builders in future as much as possible.

Is it not strange that Mr. Stone, who seems so familiar with the dangers and difficulties of the Scylla and Charybdis of long and short quantities, that he so graphically describes, appears to have turned "a blind eye that even Nelson himself might have envied" on the clear calm way between the "long" rock and the "short" whirlpool—correct quantities that he treats as something unknown or impossible. Mr. Stone's protest against the paragraph in your article (in the "B.N.," Aug. 17) that "the plaintiffs soon found that the quantities were very deficient" is also passing strange, for he immediately admits its correctness. You do not say how the deficiencies arose, or who was to blame for them. He says he could have proved that the quantities did not "apply to the church as executed, in consequence of alterations made after they were taken out," and adds "that he was sued for items that were omitted by the express instructions of the architect"; but he further admits in the vague and shuffling terms, "It is quite true that there may have been original vices (!); on the other hand, there may have been excesses," that the quantities were doubly wrong, being viciously "short" and excessively "long," to the loss of both builder and owner; and surely he must have been accountable to either if there was "privity of contract" between them. But, by a rule-of-thumb happy-go-lucky system of equity he thinks one should balance the other, and no doubt it was supposed to be the law, and probably still is where there is "privity of contract" (by the builder agreeing with and receiving the quantities from the surveyor), that the former could only recover for his net loss by errors in the quantities.

As Mr. Stone's letter tends to make "confusion worse confounded" of the decision in "Priestley and Gurney v. Stone," which involves important consequences to all connected with building, I have ventured to refer to it at greater length than may be admissible, and would further suggest that instead of allowing the decision to be strained further than it goes, the R.I.B.A., the R.I.A.I., and all architectural associations and societies should, after consideration and consultation, define the relative duties and liabilities of owners, architects, surveyors, and builders; and, if it is not too late, say how justice should be done to the builders in the above case, who seem to have an equitable claim against the surveyor, who admits "there may have been original vices" in the quantities; the architect, who, by meddling in



the issuing of the quantities, willed "privity of contract," and by (if it is true) altering the drawings and writing the specification after the quantities were taken out, and expressly directing works to be omitted from the quantities that were included in the contract (if this is credible it is not creditable); and the owners, if they do not pay the just value of the work done for them, even though their legal position, like the surveyor's, may be impregnable.

—I am, &c.,  
Aug. 25.

M. M.

SIR,—If the following conditions were observed in arranging a contract, we should, I think, hear but little of such cases as the above:—

(1) The quantities, where practicable, to be prepared by the architect of the works, or, failing this, by a responsible competent surveyor acting for him, but in either case with the full consent of the employer, who should pay directly for them, instead of—as it seems to me—the objectionable secondhand manner, so to speak, now generally adopted.

(2) The quantities to be made part of the contract, and used as the basis for pricing the variations as far as they will apply, and any other to be priced by the architect or his surveyor in a fair and reasonable manner.

(3) A clause should be inserted in the contract allowing either the employer or contractor, in case of any known or suspected discrepancy, by writing, to require any portion of the works to be measured by the architect or his surveyor after completion, and should any excess or deficiency be discovered the same to be adjusted at the contract rates, and in the event of the employer claiming a deduction, or the contractor an extra, which should prove—after measuring up—to be unjustifiable, the costs of the measuring to be borne by the party requiring it; but if an error has been made, the architect or his surveyor is to adjust the same without charge to either party.

I have adopted these conditions for some time, and they have generally given satisfaction to all parties interested.—I am, &c.,

JUSTICE TO ALL.

#### "WANTED, A PROTESTANT CONTRACTOR."

SIR,—Under this heading "J. L. R.," of Dublin, tries to ventilate a would-be Irish grievance! But he is very careful to ignore the fact that in poor Ireland the people who advertise for "Protestant contractors" simply take their cue from the Romanists. How often do we hear of a Roman Catholic in that unfortunate country giving a contract he has the disposal of to a Protestant? We know little or nothing of such narrow-mindedness in England, where the Romanists are in the minority. If "J. L. R." wishes to trace the original of such advertisements as the one he takes present exception to, he can do so in seven letters, by simply reading the word "Priests!" Thank God, in England we are yet

COSMOPOLITAN.

#### STORAGE OF RAINFALL.

SIR,—In the interesting article on Rainfall in the BUILDING NEWS of August 17, mention is made of the separator, a machine for storing clean rain-water.

It may be useful to describe the simple automatic apparatus I have used for this purpose in South America, where rain-water is universally stored for domestic use.

As shown in the sketch, it consists of a metallic box 18in. by 15in. by 6in., and adapted to a 4in. rain-water pipe. It acts in the following manner:—

The cistern A being empty, the weight of the float B keeps the valve C open. The rain-water enters the apparatus through the pipe M, passes through the strainers N N, along the passage D, over a movable weir or gauge E (which can be made of various sizes according to the quantity of water flowing from the roof), to the foul-water pipe F; at the same time a portion of the water enters the cistern A through a small hole or tube G, discharging at a lesser rate through the small tube H, the float B rises with the water in the cistern and closes the valve C, thus diverting the flow to the storage-tank or well. When the rain ceases the cistern is emptied through the tube H, and the valve opens for the next rainfall.

A modified form of the apparatus provides for intermittent rainfalls of intervals of five and six hours.

The machine is so constructed that the water shall not flow into tank until the roof has been thoroughly cleansed, and this is effected by using special gauges to regulate the flow of water to the cistern A.

The cost of the machine in zinc in London is about 30s.—I am, &c.,

JAMES G. KILLEY, A.M.Inst.C.E.

7, Ham Park-road, West Ham, E.

#### CHIPS.

Mr. Philip Blakeway T'Anson, second son of the late President of the Royal Institute of British Architects, died on the 22nd inst. at Headley, Hants, aged 43 years.

The memorial of the 28 men who lost their lives in the explosion at Elemore Colliery, near Newcastle-on-Tyne, in December, 1886, was unveiled on Tuesday in St. Michael's Churchyard, Easington. It is of grey granite with red granite columns, and was designed and executed at a cost of £150 by Messrs. Emley and Sons, of Newcastle.

Dr. Perowne, Dean of Peterborough, makes an appeal for further funds in order to complete the restoration of the cathedral. At least £18,000 is required to secure the safety of the fabric. When that has been done the restoration of the choir will be undertaken. Towards this object some special gifts have been promised, but the Dean and Chapter do not feel it right to begin the internal fittings and decorations till all has been done that the architect recommends in the way of substantial repairs.

The memorial stone of a new public hall and reading-room at Kingussie, N.B., was laid on Wednesday week. The total cost is about £1,400, and the chief hall will measure 42ft. by 32ft., and 24ft. in height, and will be seated for 500 people. Mr. Macintosh, of Inverness, was the architect.

The Free Methodist Chapel at Rodley, near Leeds, although only erected in the year 1860, having become too small for the congregation, a more commodious edifice is being built on the opposite side of the road. The plans have been prepared by Messrs. Kendall and Bakes, architects, Idle, who have adopted "a combination of the Italian and Early English styles" for the building, which is to be of stone throughout. The new chapel will seat 450 persons.

The will of the late William Eden Nesfield, of Brighton, the well-known architect and draughtsman, has been proved, the personality amounting to over £13,000.

A new Wesleyan chapel at Eastleigh, near Southampton, was opened last week. Mr. Stagg was the builder, and the cost was about £500.



# Intercommunication.

## QUESTIONS.

[9727]—**Square Root.**—Would one of your readers kindly give me the square root of 2 mathematically exact? The ordinary rule gives a result in recurring decimals. Cannot an exactly mathematical result be given by means of a vulgar fraction or a mixed fraction, in the same manner as  $\frac{1}{3}$  may be so stated, or as  $0.33\frac{1}{3}$ ?—X.

[9728]—**Fixing Standards on Stone.**—Is sulphur or lead the best fixing for iron standards in stone, and why?—POST.

[9729]—**Furnace Chimney Shafts.**—When these are used for very high temperatures it is usual to line the lower part of them inside with a lining of fire-brick of  $\frac{1}{2}$  brick, 1 brick, or  $1\frac{1}{2}$  brick thick, as the case may require, and it is usual to leave a space between this fire-brick lining and the brickwork of the shaft, to allow room for the diametrical expansion of the lining, so that, taking the case of a round shaft, the lining forms a separate cylinder within the cylinder of the shaft, with a small space between the outside surface of the inner cylinder and the inside surface of the outer cylinder. If this space be left open at the top it gets filled with flue dust, which, being heavy and compact, communicates the expansion of the inner cylinder to the outer one, and the *raison d'être* of the arrangement is lost. If the space be covered over at the level of the top of the inner cylinder, I am told that mischief is sometimes worked by the explosion of gases in the inclosed space. If, to prevent this, air bricks are let in at top and bottom of the space, communicating with the outer air, so as to keep the space always ventilated, the draught of the chimney is injuriously affected by cooling the outside surface of the inner cylinder, and so facilitating loss of heat from the interior of the chimney by radiation; and if the covering of the space should become accidentally misplaced in part, this arrangement would have the evil effect of letting cold air directly into the flue. Which, on the whole, is best—to cover, or leave uncovered, the space between the lining and the chimney? I assume that if covered the covering bricks should not be bonded into the chimney, but merely touch or abut against it at their ends. Is that right?—X.

[9730]—**Hot-Water Pipes.**—Will "H. E." give the maker's name of the glass-lined pipe referred to by him in a reply given in the BUILDING NEWS, May, 21, 1886, No. 8826?—J. S.

[9731]—**Claim for Damage from Settlement.**—A and B. between them own a pair of semi-detached houses—i.e., A. has one, and B. the other. A's house shows signs of rupture from settlement, and has had a few repairs in consequence. B. wants to know if he would have any claim against A. for any damage that may accrue to his house consequent on the settlement of A's house?—A. H. H.

[9732]—**Contractors and Quantities.**—When an architect has provided quantities for the convenience of contractors tendering, can a contractor, if he wills, take off his own and ignore those prepared, and after doing so, should he be accepted, can he repudiate the claim of the surveyor for quantities?—FAIRFAX.

[9733]—**Plans of Old Buildings.**—What is the best method to adopt where accuracy is advisable in taking measurements in detail of the interiors of old buildings—which are frequently of irregular shape, and mostly plastered—for the purpose of preparing plans for alterations and additions to the fabric?—WILLING LEARNER.

[9734]—**Contract and Conditions.**—Will some of your able correspondents state where the one ends and the other begins, and how to draw the line between the two?—DOUBTFUL TOMMY.

[9735]—**Timber.**—I have been reading Mr. Stevenson's interesting book, "Trees of Commerce." Would Mr. Stevenson, or some of your readers, kindly inform me what is the meaning of "thick baited," as applied to fir trees, at page 159? I assume that the term, "Southern Russian ports," used in other parts of the book, do not really refer to southern ports of Russia, but to southern ports of North Russia. I suppose the southern ports of Russia are really in the Black Sea, from whence we do not get timber.—R.

[9736]—**Honours Exam. in Building Construction.**—Would some reader of the "B. N." kindly inform me what book on chemistry I should get in order to understand the chemical terms in Rivington's Vol. III., the name of publisher, and price? Perhaps the gentleman who answered my last question relating to this exam. would kindly oblige.—VERITAS.

[9737]—**Quantity Surveyor's Fees.**—I shall esteem it a favour if any reader will reply to the following questions:—1. Am I right in believing that the proprietor of a building is liable to a surveyor for quantities if the works are not carried out? 2. If works are carried out, is the builder liable? 3. Would the architect be liable if he did not disclose the name of his principal in the event of the principal refusing to pay when the works are not carried out?—QUANTITY SURVEYOR.

[9738]—**Grubs.**—Will any of your readers inform me what is the best course to adopt under the following circumstances?—Having erected some stabling two years ago, I now find the woodwork (especially in hay loft and harness-room) swarming with small white grubs. Wood naphtha has been applied, but without having any material effect.—A. T.

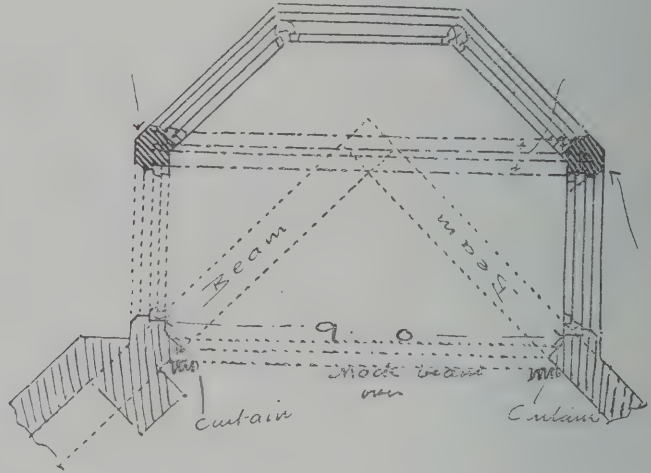
[9739]—**Durham and Yorkshire.**—Intending to take a holiday in South Durham and North Yorkshire, shall be glad if any kind reader will give places worth visiting and sketching, and best way of reaching same.—CONSTANT READER.

## REPLIES.

[9712]—**Theatre Exits.**—"Exit" will find the information he requires in the BUILDING NEWS, Feb. 3, 1888, in the review of a work entitled "Theatre Construction and Maintenance," by J. G. Buckle, A.R.I.B.A.,—STAGE DOOR.

[9712]—**Theatre Exits.**—I cannot put my hand upon some notes made on this subject a few years since, but am of opinion that Captain Shaw refers to it in his reports on theatres to the Metropolitan Board of Works some four years since. Why does not "Exit" obtain permission to take notes from personal observation at the doors of, say, two theatres?—H. L.

[9714]—**"Redcoat" Knock, Belfast.**—The accompanying plan will, I trust, clearly explain the point upon which "Provincial Architect" desires information. The heavily-shaded octagonal joints, one of which is shown on either side of bay, are stone piers; the dotted



lines directly connecting these indicate the position of a double row of railway bars, carrying the ends of beams, tailing well into walls.—T. MCC. JOHNSTON.

[9715]—**Western Towers.**—I am not aware of many churches near London of the description given. In Norfolk and Somersetshire there are many of these. I may mention Worstead Church, Norfolk; Filby Church, Marthon Church, Hingham Church, Deopham Church, and several others. In Somersetshire I may mention the fine church of St. Cuthbert, Wells, with a splendid Perpendicular tower; Evercech Church, and several more, in which the tower opens by a lofty arch into the nave.—G. H. G.

[9716]—**Load on Roof Truss.**—The load is distributed on the ridge and points of support of each principal rafter. The load is made up of the slate or other covering, the roof boarding, and the roof framing, including snow and wind. For an ordinary roof, a load of 50lb. per sq. ft. horizontal may be taken. This load equals half the pressure per foot of inclined surface, multiplied by the length of rafter, divided by the span, both in feet. For explanation of the manner of distributing the loads, see any treatise on graphic statics, or consult answers in the BUILDING NEWS, where several replies to this question have been given.—G. H. G.

[9716]—**Load on Roof Truss.**—"T. E. R." gives no idea of the span or construction of the roof. It is generally assumed that the weight is at the apex, causing the feet of rafters to spread. Refer to the diagrams in pages 73, &c., "Science of Building," by E. W. Tarn, M.A.—H. L.

[9718]—**Characteristics of Masonry.**—I think that "D." will find that the 12th-century joints are wide and the mortar of coarse sand. As Gothic architecture progressed the joints decreased in thickness.—H. L.

[9718]—**Characteristics of Masonry.**—The vertical joints are often wide in the earlier examples, and the stones large; later in the 12th century, smaller stones were used. The mortar was generally of lime, with large grit or sand; but it is impossible to draw any further distinction between masonry of different localities than that which was due to the materials quarried and used.—G. H. G.

[9719]—**Easter Sepulchre.**—This was often a recess or arched canopy in the wall, and was on the north side of chancel, not far from the altar. Examples are to be seen at Heckington, Lincolnshire; Holcombe, Burnell, Devon, and in several churches in Somersetshire, Oxfordshire, Norfolk, &c.—G. H. G.

[9721]—**To Estimate Brickwork.**—There is nothing very difficult in working out brickwork on the abstract with two columns. I know of no tables.—H. L.

[9723]—**Portland Cement Slabs.**—I see no reason except convenience of transport for limiting the size of cement concrete slabs. Certainly 6ft. by 3ft. by 6in. could be made and taken anywhere with care. Would it not be better to make the landing, or whatever it is in position, and thus save risk of cracking, &c.?—H. L.

[9724]—**Quantities.**—At one time all specifications provided for the joists being notched on to the plates, and it is the custom to describe all floor joists except ground joists as fir framed.—H. LOVEGROVE.

Museum-street Wesleyan chapel, Ipswich, a building in the French Decorated style, erected in 1860 from plans by Mr. F. Barnes, F.R.I.B.A., of that town, was reopened on Tuesday week after restoration, including renovation and reinstatement of freestone dressings, and improvement of the heating and lighting—works carried out at a cost of £600 from plans by Mr. William Eade, F.R.I.B.A., of Ipswich.

## WATER SUPPLY AND SANITARY MATTERS.

STAFFORD.—The twenty-one days' pumping required by the Local Government Board having been completed at the Milford Well, the members of the Stafford Waterworks Committee visited the works. Among those present at the pumping-station were the mayor, Messrs. W. B. Rudge and G. Griffith (the contractors), and Mr. Blackshaw (the borough surveyor). A well 4ft. 6in. in dia-

meter had been sunk near the permanent well, which is 12ft. in diameter, and which, after a depth of about 15ft. had been reached, it was found impossible to sink further on account of the influx of water, and continuous pumping for twenty-one days was therefore commenced on July 30 in the little shaft. During that time no less than 9,735,578 gallons of water has been raised, or an average of 463,599 gallons every 24 hours. This is 63,599 gallons in excess of the contract. The party were also conducted by Mr. Blackshaw to the proposed site of the reservoir, which is some half-mile further in the Colwich direction.

## LEGAL INTELLIGENCE.

INSUFFICIENT AIR SPACE TO DWELLINGS.—Mr. Justice Denman, sitting as Vacation Judge in the Chancery Division of the High Court of Justice, had an application made to him on the 23rd inst. to restrain the Doncaster Sanitary Authority from pulling down a house on the ground that it had been so erected as not to comply with a by-law prescribing a certain amount of air space behind the house. It is alleged that the applicant, since the erection of the house, had purchased a portion of a field sufficient to enable him to provide the requisite air space. His Lordship granted an injunction for a week.

HAWKESLEY V. LIVERPOOL CORPORATION.—AWARD OF THE ARBITRATOR.—Mr. Bosanquet, Q.C., the arbitrator appointed by consent to deal with the claim of Mr. Thomas Hawksley, M.Inst.C.E., against the Corporation of Liverpool, for services rendered in connection with the Vyrnwy water scheme, has now given his award. The terms of the award are that Mr. Hawksley receive £14,123 in addition to the sums, £20,617 in all, already paid to him by the Corporation, and that the latter bear all the costs of the arbitration, which will reach a very considerable amount. The case was reported in our issues of April 6 and June 1 of the present year, pp. 519, 761, last Vol. It will be remembered that Mr. Hawksley broke off his association with the Vyrnwy scheme when he found that Mr. G. F. Deason was named as joint engineer with himself. The award will come before the Water Committee on Monday next.

A discovery which tends to establish a Roman occupation of Peterborough has been brought to light during the past week. In the north transept of the cathedral, beneath the Saxon level, and 9ft. or 10ft. from the present surface, there was found an ancient well rudely cut in the rock. Only a corner was enabled to be uncovered in the present excavation, and from this were extracted fragments of Roman pottery and a number of wedged-shaped bricks roughly burned in hedge choppings, similar to the old Dutch clinkers. The largest was six inches in length. Some are much broken.

In the list of receiving orders is the name of Henry John Paull, of Burghley-road, Kentish-town, carrying on business with A. A. Bonella at Quality-court, architect.



Aug. 31, 1888.

## Our Office Table.

A LOAN exhibition of old masters was opened on Tuesday in the Birmingham Municipal Art Gallery, and comprises some 120 works executed between the beginning of the 16th and the end of the 18th century. The nucleus of the exhibition consists of some 90 works selected from the gallery of portraits belonging to Sir Thomas Barrett Lennard, of Belhus, Surrey. This collection, which has hitherto been seen only by the favoured few, has been made from generation to generation from about 1580 to the present time. All the principal persons of the family descended from Sir Samuel Lennard since its settlement in Kent towards the close of the reign of Queen Elizabeth had their portraits painted by the most eminent artists of their day, among them being Hans Holbein, Lucas de Heere, Cornelius Janssen, Sir Anthony Van Dyck, Francois de Troy, Michael Dahl, and Sir Peter Lely. Other contributors are the Duke of Westminster, who lends ten works from Grosvenor House; the Duke of Norfolk, who has allowed three Van Dycks to be taken from Arundel Castle; the Marquis of Hertford, the Marquis of Lansdowne, the Earl of Dartmouth, Lord Windsor, the Earl of Coventry, Mr. H. Pfungst (to whom the gallery is indebted for a loan collection of antique majolica), Mr. W. Agnew, Mr. Whately, of Clifton, and the Rev. Mr. Nicholson, of Droitwich. A few blanks are filled by loans from South Kensington.

A SOCIETY has been formed with the object of promoting the long-neglected restoration of ancient crosses. In past ages no churchyard was considered complete without its cross, while the same symbol was often the most conspicuous adornment of market-places, and in remoter districts was a no less familiar object by the wayside or the fountain. At the same time within the church the great rood was treated as second only to the altar itself. It is not, therefore, surprising that the number of existing remains is very considerable. Over 200 of these outdoor crosses are said to survive in the county of Somerset alone; but hitherto comparatively few have been rescued from profanation and neglect. In most cases a base or socket, frequently raised on steps, with occasionally a broken shaft, is all that remains. But these, lacking as they do the emblem of the Christian religion (to carry which was the very purpose of their erection), are now meaningless, except as witnesses to the indifference, or worse, of recent generations. It is not desired in any way to renovate these venerable monuments, and so to destroy their artistic or antiquarian interest, but merely to make good the ravages, not so much of natural decay as of wanton sacrilege. Nor does the society intend to supplant, but rather to stimulate, local effort and enthusiasm; though at the same time, by contributing a fair proportion of the necessary expense, it would render possible, even in the poorest districts, the execution of satisfactory designs. The society will probably confine its earlier efforts to the re-erection of churchyard crosses only, with the hope, however, of ultimately including wayside, rood, and other crosses within the scope of its action. The annual subscription is half-a-guinea for members and five shillings for associates, due upon the 1st of January each year. Subscriptions may be compounded for a life payment of ten guineas. Application for membership to be made to F. C. Eden, The Cottage, Ham Common, Surrey.

THE annual statement of the general progress at the British Museum states that a commencement has been made of an exhibition of the Greek and Roman sepulchral monuments and other sculpture hitherto stored away in imperfectly-lighted rooms in the basement of the Museum. Intended structural alterations have been postponed owing to disappointment in the necessary supply of funds asked for, and promised, for the past year. It is expected that provision for these works will be made in the grant for the year 1888-1889, and that the remainder of the monuments will find adequate exhibition space in a well-lighted lower floor of the present room. From apprehension of injury by exposure to light and changes of atmosphere, it has been found necessary to remove from the walls of the north-west staircase

the framed Egyptian papyri exhibited there for many years, but a small selection has been placed on view in the Upper Egyptian Gallery. The wall-space of the staircase will be covered with mosaics from Carthage, Halicarnassus, and other sites, many of them not before exhibited. In the other gallery has been placed on view a series of Japanese paintings, with a few early Chinese works, taken from the collection formed by Mr. William Anderson, and purchased from him in 1883. Attention is again called to the inadequacy of the present reading-room for accommodation of the ever-increasing number of applicants for admission. The number of visitors to the room has risen from 105,310 in 1875, to 182,773 last year. No further addition can be made to the number of seats without inconveniently diminishing the desk space allotted to each reader.

Mr. Fox, C.E., has made for the Dean and Chapter of Durham a survey of the river Wear within the city with reference to the sanitary improvement of the district, and especially the proposed heightening of the Old Museum Weir. He points out that no fewer than 42 sewers empty into the river between the Baths and Prebends' Bridges (a distance of about three-fourths of a mile), and, although the river on the date of inspection was at about its ordinary level for this time of the year, 24 of the sewer outlets were exposed to view, and standing from 3in. to 2ft. 6in above the water level. If the weir is heightened 18in. there will be, he says, only four of the above river outlets exposed to view in all ordinary states of the river, and these could easily be continued further into the river, so as to have their outlets below the water level. The lowest possible height the weir should be raised or heightened, so as to effectually cover the sewer outlets in all ordinary states of the river, between the Baths and Prebends' Bridge, is 18in., and this will not, Mr. Fox believes, in the ordinary floods to which the river is subject, increase, in any appreciable degree, the present danger to properties on either side of the river. Should the weir be heightened as proposed, the extra depth of water in the river will be, he thinks, a sanitary improvement of importance to the inhabitants of the city, and the river will then be navigable from the University boat landing to a little above Shincliffe Bridge (a distance of about 2½ miles), in all ordinary states of the river.

A VERY useful compendium of the leading universities, colleges, and technical schools in America has been compiled by Mr. C. Powell Karr, C.E., Ph.B., of the School of Mines, Columbia College, an architect and member of the New York Architectural League, which gives in a comprehensive and tabular form the courses of study pursued, the requirements of admission, the cost of a collegiate or technical course of instruction, and other particulars. Such a guide was the more necessary, owing to the rapid increase of new universities and colleges. No less than seventy-four of the leading educational establishments of the United States and Canada have been tabulated by Mr. Karr, and one of the tables gives a list of the textbooks required in every college. To architectural and engineering students, as well as to those pursuing other professions, Mr. Powell Karr's Manual will be of signal service.

ARCHITECTS will find Mr. James Hill's new catalogue of locks, door furniture, and other ironmongery accessories most useful in writing specifications, as it practically covers its field and is so well arranged. Each separate class of goods is figured, numbered, and priced on the same page, black and bronze samples are distinguished artistically and accurately, and it is absolutely impossible to make a mistake in ordering. The well-known reversible rim and four-handed brass-rim locks head the list, and are followed in turn by the various specialities which have made Mr. Hill's name familiar. Mortise locks, latches, escutcheons, hinges, handles, door furniture, finger-plates, lock-plates, bell-pushes, bell-pulls, knockers, sash-handles and lifts, casement bolts and bars follow, and a new fanlight and skylight opener, which is as novel as it is ingenious, and about which we shall have a word to say separately shortly. Altogether the catalogue is among the best and most comprehensive of its class.

ON Saturday, Aug. 25th, a section of the employees of Messrs. Gregory and Co., Station

Works, Clapham Junction, held their annual excursion and dinner, leaving Clapham Junction by an early train for Portsmouth. They spent the morning in visiting the dockyard, Southsea, and other places of interest, and mustered for dinner at Maybore's Restaurant. Mr. G. C. Hudson (one of the partners) presided at a very well-served dinner, after which the usual toasts were honoured. Mr. Hudson, in replying to the toast of "The Firm," hoped that the good feeling between all parties so evident this day would increase day by day, and not be confined to special occasions like the present, and that each succeeding meeting might, if possible, find the interest of all connected with the firm more firmly cemented. The party, numbering about 100, left Portsmouth at 2.15 for the Isle of Wight, returning to Clapham Junction via Portsmouth, reaching home about ten o'clock, after having spent a thoroughly enjoyable day.

### MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Clerk of Works' Association. Monthly meeting, Carpenters' Hall. 8 p.m.  
TUESDAY.—Glasgow Architectural Association. "A Tour in Italy," by W. J. Anderson, "Alexander Thomson" Travelling student.  
SATURDAY.—Architectural Association. Visit to Hatfield House. Booking-offices, G.N.R., 2 p.m. Special ticket, 2s. 6d.

Architectural Association.—The sixth vacation visit will be made on Saturday, September 8th, to Hatfield House. Names, with postal order for 2s. 6d., to be sent to Mr. Ernest S. Gale, 5, York-buildings, Adelphi, not later than Wednesday, Sept. 5th. Party to meet in the booking office at King's Cross, G.N.R., at 2 p.m. Thos. Edward Pryce and Frederic R. Farrow, Hon. Secs.

### CHIPS.

The Wesleyan chapel at Cirencester was reopened on Thursday, the 23rd inst., after internal restoration, including new panelled ceiling of pitch pine, reseating, and improvement of the lighting. Mr. William Newcombe, of Cirencester, was the builder.

At a vestry meeting held at Bishopstoke, Hants, last week, it was decided to erect a new parish church in place of the existing one, erected on the site of a Norman building in 1826. Towards the cost, estimated at £4,000, £1,000 has been given by one donor, besides an acre of land as a site.

On Wednesday week foundation-stones of a new Primitive Methodist Chapel were laid at the village of Scackleton, near Hovingham. The building will cost about £200, and will have seats for 120 people. The design is by Mr. C. H. Channon, Malton.

A monument to the Brereton family hitherto blocking up one of the windows in the chancel of Bowden parish church, Cheshire, has just been removed to the north transept, Messrs. Sheldon and Morton being the contractors. The window so opened out has been filled with stained glass as a memorial to the late R. A. Warburton; the subject is the Ascension, and the work has been carried out by Messrs. Burlison and Grylls, of London.

The new boys' public day schools, Kentish-town, are warmed and ventilated by means of the patent Manchester grates supplied by Mr. E. H. Shorland, of Manchester and London.

At a special meeting of the Belfast Water Commissioners, held last week, it was decided, on the advice of the engineer, that a cheque for £1,500, in favour of Messrs. Fitzpatrick Bros., Great Victoria-street, Belfast, be signed, being a bonus for having the contract for the culvert connecting the Stoneyford with the Lagmore reservoir completed under the specified time.

Alterations have been made to the Masonic Hall, Hong Kong, including the ventilation; Messrs. Robert Boyle and Son's latest improved self-acting, air-pump ventilators being adopted for the extraction of the vitiated air.

On Saturday the memorial stone of a new Established Church at Shawlands was laid by Sir John Maxwell, of Nether Pollock. The style is Early English, and the estimated cost of the building, together with a suite of halls, is about £6,000.

A Local Government Board inquiry as to the application of the Corporation of Manchester to borrow £450,000 for the purpose of carrying out a sewage scheme, and £40,000 for the purchase of land on which to deal with the sewage deposit of the city, has been fixed for the 10th September. Opposition to the scheme will be offered by the Barton-upon-Irwell Rural Sanitary Authority, the Local Board of Eccles, property owners and residents of Davyhulme and Urmston, and others.



## Trade News.

### WAGES MOVEMENTS.

**LEEDS.**—At the request of the committee of the Leeds Carpenters and Joiners' Association, the masters have agreed to meet a deputation from the men this (Friday) evening, with a view to arriving at some settlement with regard to the strike which has existed during the last few weeks.

### CHIPS.

A mummy and portrait, recovered by Mr. Flinders Petrie from the Necropolis, built in Græco-Roman days, on the site of the Labyrinth in the El Fayoum, have been presented to the Peel Park Museum, Salford. The portrait is that of a boy, is painted in wax on a cedar panel, and is of the second century of the Christian Era.

The Grove Wesleyan Chapel at York was reopened on Friday on the completion of internal decoration, carried out by Messrs. W. Bellerby and Sons, of Petergate, and the erection of an organ, built by Messrs. Forster and Andrews, of Hull.

The late Mr. T. Heygate Vernon, A.R.I.B.A., who for several years carried on the professional practice of Mr. E. M. Barry, R.A., has now been succeeded by Mr. E. Elton Hawkins, of 19, York Buildings, Adelphi, W.C. The latter gentleman was for a long period associated with both the deceased architects.

Norwich Castle, so long used as a prison, having been acquired by the corporation, will, at a cost of about £11,000, be turned into a public museum and art gallery. The greater part of the money has been subscribed or promised, and the alterations will shortly be proceeded with.

A memorial has just been erected in Dingwall churchyard to the memory of Frank Harper, Torgorm, who half a century ago was known as the champion athlete of that county, and was the first to introduce, about forty years ago, the games of curling, bowling, and cricket into Ross-shire. The memorial consists of a marble medallion portrait of Harper by Mr. Andrew Davidson, Inverness, inserted in a slab of red sandstone from Dumfriesshire.

The new line of the London, Chatham, and Dover Railway from Blackheath Hill to Stockwell-street, Greenwich, on the Nunhead branch, which has just been completed, will be opened for traffic to-morrow (Saturday).

On Saturday the new Temperance Hall at Ossett was opened. The new premises are of stone, two stories high. The ground floor is occupied by a small lecture-room, reading-room, committee-room, &c.; and above them is the hall proper, 66ft. by 34ft., with end gallery. The hall will be seated for 550 persons. The cost of building and furnishing amounts to £1,500.

Two miles of tramways have just been completed by the Bradford Tramway Company between Frizinghall and Saltaire, and were formally opened by Major-General Hutchinson, of the Board of Trade, on Wednesday week. Mr. Cartwright was the engineer, Mr. Dowell the contractor, and Mr. Morgan the clerk of works.

An important addition to the premises of the Birmingham Library, Union-street, was thrown open on Monday. This addition consists of a gentlemen's smoking-room, a ladies' drawing-room, and a librarian's room, with entrance lobby opening into the ground floor of the old library premises. The walls of all the new rooms and of the lobby are covered with shelves which can be made capable of storing about 20,000 volumes. The building and fitting-up was carried out by Messrs. J. Barnsley and Sons, and the furniture was supplied by Messrs. Morris and Norton and Messrs. Chamberlain, King, and Jones. The hot-water fittings are by Messrs. Hope.

A special meeting of the Highway Committee of the Sheffield Town Council was held on Tuesday for the purpose of recommending a candidate for the office of borough surveyor. There were originally 150 applicants for the post. These were reduced to six, each of whom attended before the committee on Tuesday. It was decided to recommend Mr. Charles F. Wike, C.E., assistant borough surveyor, Leicester, to the council for appointment. The salary is £800 per annum.

A new Free Church in Glebeside-road, Galston, N.B., was opened on the 23rd inst. The building is in the Early English style, and the number of sittings provided is 560. The total cost has been £2,500.

The Stockton-on-Tees School Board have purchased a site, containing 4,050 square yards, in Oxbridge-lane, and instructed their architect, Mr. Weatherill, to prepare drawings for a school to accommodate 700 scholars. Additions to Bailey street schools are also contemplated.

**Holloway's Ointment.**—Sores, wounds, ulcerations, and other diseases affecting the skin, are capable of speedily amendment by this cooling and healing Ointment, which has called forth the loudest praise from persons who had suffered for years from bad legs, bad breasts, piles, abscesses, and chronic ulcers, after every hope of cure had long passed away.

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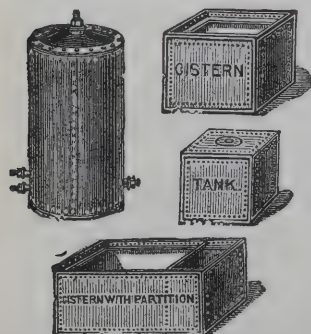
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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1757.

FRIDAY, SEPTEMBER 7, 1888.

## THE ARCHITECTURAL USE OF CEMENT.

WHY did cement and stucco architecture die so suddenly and ignominiously? Other materials that have taken their place—brick, terracotta, half-timber work—have retained their popularity mainly because they became visible protests against what was regarded as a sham and a counterfeit. There was nothing radically wrong about Portland cement. Except that it could so easily be made covering to brickwork, and lent itself so obviously to imitate carved stonework, nothing could be said against a material of the greatest value in construction. Architects designed elevations in it upon the principles of worked and carved stone; but they unfortunately sacrificed its reputation by so doing. It was cheaper than stone, and upon this rock the material fell to grief. A building was designed for Portland stone; the elevations were prepared accordingly with moulded and enriched cornices of large projection, stringcourses, architraves, and pediments to windows and doors, carved ornament, quoins, and other things, all very proper things for stone. The tenders came out too high, and the fatal suggestion occurred that it could be carried out in cement at half the cost. Who could resist the temptation to have a costly stone front executed in a material so like stone, and even more durable? This was the fatal rock upon which cement architecture was wrecked. Every little builder tried his hand at designing fronts with all the Classical details and ornament which at one time were only lavished on costly edifices. Every style of architecture could be copied in a material so plastic, so readily moulded into any form. The reign of stucco was not a long one. Half a century ago Brighton and a score of other towns rising into notice were rebuilt in cement, and it was beginning to be the taunt that, unlike the Romans, who found some brick and left it of marble, we were speedily reversing the boast by finding our buildings of stone and brick and leaving them of cement. The anti-stucco crusade set in, and in less than a decade or two the disuse of cement became marked. A great many suggestions for treating cement as cement were thrown out; but there was a popular revulsion of feeling, and the very name of cement was held in disrepute.

After the lapse of twenty years the profession can look with calmness and equanimity upon the change, and all the angry things that were said for and against cement. We have now passed the stage of imitation, and have reached that of inquiry into principles—criticism. We now see exactly why was that our predecessors erred in the use of cement; how absurd and improper it was to imitate stone forms and stone treatment in cement or any other plastic material. When we look at one of these cement-fronted buildings we can see the mistake into which the stucco architect fell. His cornice was exactly like one of stone, projecting to the full extent, with heavy trusses or modillions of the same material. He did not think it wrong to produce this projection by subterfuge, by inserting a core of rough stone and brick upon which to run his cement mouldings. His window or door pediments, even engaged columns, were constructed in the same manner by rough cores cemented over. All these features if of stone would be solidly constructed, but in cement the only way was to bring them out, and then encase them. All

high relief ornament, deep mouldings, were equally as objectionable as block cornices, contrary to the proper treatment of cement. Cores could be formed anywhere, and projections and ornament appeared that would be impossible in stone construction. All these features were then clearly improper in cement. Blocked cornices, pediments, engaged columns, and pilasters, and high relief mouldings properly were stone features. Another practice which added to the offence, and which was a direct falsehood in construction, was the jointing of the cement work and the use of angle quoins.

Having pointed out the nature of the wrong treatment, the employment of an architecture which was essentially derived from stone construction, we have now to consider the nature of cement and how it can be used architecturally. We do not advocate the use of cement in preference to stone or brick, but we desire to point out that it may be used in quite as inoffensive and artistic a manner as any other material. What, then, are the principles for the architect's guidance? We may state it as a leading postulate that, as cement is a plastic substance and is applied in a semi-liquid state, it should be treated as a thin coat laid over another material. This proposition being established, it follows that any attempt to treat it in imitation of worked stone is a great mistake; it follows also that the coating should be broadly laid and in flat surfaces; that all mouldings should be run in the thickness of the cement, and generally that all ornament should be shallow and on the surface. Following these principles or maxims, let us see how we can apply them to an ordinary façade to take the cornice. Carrying out our rules, the cornice should be of shallow projection; instead of composed of several solid members, the ornament would properly consist of a shallow cove or flat, frieze-like ornament in incised lines. If colour be introduced, this is one of the best places for it. The wall surfaces, on the same principle, will be left flat, with incised ornament introduced in panels or in courses. Mouldings run in the thickness of the cement or of very slight projection, splays, and bands of encaustic tiles, and stencil plaster work in coloured cement will be the proper mode of dividing the front horizontally. The mode of treating window dressings should follow the flat treatment. Instead of moulded architraves, sunken members or lines appear to be the legitimate means of obtaining relief or moulded splays round the reveals. The hackneyed trusses are indefensible decorations, and so also are keystones. A flat, slight, projecting band round the opening, relieved by sunken lines or flutings, forms an effective dressing. There are few examples to which the architect can look for inspiration. The nearest approach to cement treatment we can recall to mind is the flat incised ornamentation adopted in many of the neo-Greek buildings in Paris and Glasgow, in which moulded projections are very shallow and sparingly introduced. Sir John Soane, in his museum in Lincoln's Inn-fields and in the Bank of England, has used very appropriately the flat treatment, and these are two of the few instances to be seen in London.

The texture or surface of cement, which is granular, ought to be considered. The finish given by a wood float is best suited to large flat surfaces, though the sand which works up soon gets discoloured by soot in large towns, and for this reason the smoother surface produced by the steel trowel is considered desirable. Stucco as an architectural covering was not only wrongly used, but its artistic capabilities were ignored by the early stuccoists, whose only aim appears to have been to represent stonework. It is extraordinary that the use of colour has hitherto been ignored by modern architects. We believe there would be a future for cement

and plaster if architects would introduce methods of ornamentation especially adapted to those materials. We know that the ancient Egyptians and Greeks used thin coatings of plaster for painting. At Pompeii stucco incrustations have been found which were decorated by colour. In many of our old abbeys and churches this thin coating of plaster is to be noticed, upon which decorations and scriptural subjects were painted, and many of the rubble-filled vaults were so finished.

Decorative plastering is still an undeveloped art amongst us. Confining our attention to outside cement work, we may notice how easily the often unpleasant colour of Portland cement may be disguised by the use of coloured sands and mineral colours, like oxides of iron. These will give us dark red, Venetian red, light red, ultramarine, a tint of blue, or grey. The cement is best coloured before working, and the colouring ingredients mixed dry. More might be done in flat surface decoration, as in the Italian sgraffito work, where layers of coloured cement may be made available by scratching or cutting out the upper coating in ornamental forms. The experiments made in this direction some years ago at Kensington were not satisfactory. One of the simplest modes of decorating cement surfaces is to use stencil plates of a certain thickness, which are embedded on a layer of coloured cement; the upper or finishing coating is then laid on flush with them; the plates being removed exhibit the pattern. Then we can stamp or impress patterns on the wet surface, producing a kind of diaper ornament. There are, in short, many ways by which cement, as an external covering, may be treated in a manner quite in keeping with its nature and artistic capabilities. If coloured bands or panels, incrustation and tile-work, and mineral colours in the preparation of the cement were brought into requisition, we might have a new and durable sort of architecture, and be spared the infliction of the sham castings and ornament, quoins, and other devices which became so intolerable under the old regime.

## NUISANCE BY NOISE.

THERE is no doubt that in our cities and towns the form of nuisance by noise has increased of late years, and is likely to increase yet more. As a general rule, such noise must be put up with, and made the best of, as one of the drawbacks of town life. But when the noise becomes so excessive as to interfere with the ordinary comfort of individuals, the Chancery Division will still grant an injunction. The points to be noted in regard to the rules of law regulating these injunctions are, firstly, that the noise must be really excessive, and, secondly, that the tenants or lessees alone are liable; their landlords or lessors only becoming themselves responsible when it can be proved that they knew of the purposes for which it was intended that the premises should be used. This point, as to the liability of owners, is of great practical importance, for a right of action against a mere occupier, who may only hold weekly, is of little if any value. There have recently been two cases before the Chancery Division, in which both these points were considered, and which are instructive and interesting. But before dealing with these it is necessary, to make the matter clear, that we should go back to the decision of Mr. Justice Kekewich in the action of "Winter v. Baker" (21 April, 1887), because this was referred to in the later cases. That was an action by the plaintiff, a gentleman residing at Brentwood, Essex, against the defendant, Baker, who owned a yard adjoining his premises, and his tenant, Davies, to whom it was let by the



week. The plaintiff sought to restrain both defendants from continuing a nuisance by noise, which consisted of steam roundabouts, organs, swings, shooting-gallery, and general shouting and crowding. The judge held that the nuisance was proved, and he granted an injunction against both landlord and tenant, with costs. The ground upon which judgment was given against Baker, the owner, was that, although a man was not in general liable for nuisances committed by his tenant, yet this defendant had made himself a party to the nuisance by letting the yard, knowing how it was to be used, and still more by letting it for a second week after he had had actual experience of the nuisance by noise during the first week.

In the recent case of "*Jenkins v. Jackson*" (Aug. 3, 1888), the questions raised were rather more complicated. The plaintiff was an accountant, and he was the tenant of Jackson—one of the defendants—of two rooms on the first floor of a house in Cardiff, in which house the other defendant, Summers, was also a tenant, but of the second floor. Thus, they were tenants of the same landlord, holding rooms in floors one above the other. The defendant Summers held harmonic meetings and similar musical entertainments in a large room let to him for this purpose; and the plaintiff now complained that those entertainments were accompanied with great noise and vibration, and that an intolerable nuisance was occasioned by the offensive behaviour of persons when going upstairs to these entertainments, and he asked for an injunction and costs. There was, of course, the usual conflicting evidence as to the facts, and the customary gross exaggeration as to the noise, from both sides; but Mr. Justice Kekewich held it to be proved that there was such an amount of noise and vibration caused by the music and dancing over his head as to seriously interfere with the conduct of the plaintiff's business. Thus he ruled that the existence of a nuisance was proved; then came the questions raised by the defence. It was alleged by the defendant that the plaintiff had taken his offices knowing the sort of place under which he was about to locate himself; but the judge declined to adopt this defence, as it would amount to accepting a now exploded doctrine as to coming to a nuisance. Then the defendant urged that the plaintiff had, by submitting to the annoyance for two years, though with complaints, acquiesced in its continuance, and so had no case. As a defence this failed; but it was an important fact, so far as it tended to show that the actual annoyance could not have been so great as the plaintiff now contended.

The most important point as a matter of general interest was in regard to the plaintiff's rights against his landlord, the defendant Jackson. The case against him was based partly upon his covenant for "quiet enjoyment" as contained in the lease under which plaintiff held his offices. But the judge held that "quiet enjoyment" had nothing to do with noise, being rather more like a covenant for title, and it meant that the lessee should enjoy the premises without any interruption or interference in the possession of the same. In that sense the covenant had not been broken, and so there could be no injunction based upon that ground. Seeing, however, that the lessee had knowingly allowed Summers, his weekly tenant, to use the room for dancing and music after the plaintiff's complaint, he became a party to the nuisance, and so was liable in the same way as had been decided in the earlier case of "*Winter v. Baker*," above explained. The judge therefore held that the lessor, as well as the lessee, was liable for the nuisance, on the simple ground that he had become a party to the wrong-doing by knowingly permitting it to be done upon his premises. But under the circumstances, and the fact of the

plaintiff's long delay, he refused to grant an injunction, and he ended by giving the plaintiff £20 damages for the noise and the costs of the action upon that issue.

The second recent case to which we would refer is that of "*Fanshawe and others v. London and Provincial Dairy Co.*" (18th July, 1888). That was an action by the plaintiffs, as resident occupiers of houses in Halkin-street West, to restrain the defendants from carrying on the business of dairymen in that street in such a manner as to become a nuisance to their neighbours. The alleged nuisance consisted in the banging about of milk churns and cans upon the pavement and against each other late at night and in the early morning. It was proved, and could not be denied, that a good deal of noise was made; but the real issue was whether, under the circumstances, that was a nuisance with which the Court could interfere. Mr. Justice Kekewich quoting the ruling of an eminent judge in an earlier case to the effect that to constitute such a nuisance there must be "an inconvenience materially interfering with the ordinary comfort, physically, of human existence—not merely according to elegant or dainty modes and habits of living, but according to plain and sober and simple notions among the English people." If a man chooses to live in London he must put up with the usual noises incidental to carrying on business. It would not be a defence to say that the plaintiffs had come to the nuisance, for that theory could not be upheld nowadays. But they had elected to reside in a city of noises, and as long as their trading neighbours carried on trade in a reasonable way, they must put up with those noises. A large supply of milk was needed in London, and it could not be obtained without a good deal of noise. So this action was dismissed with costs.

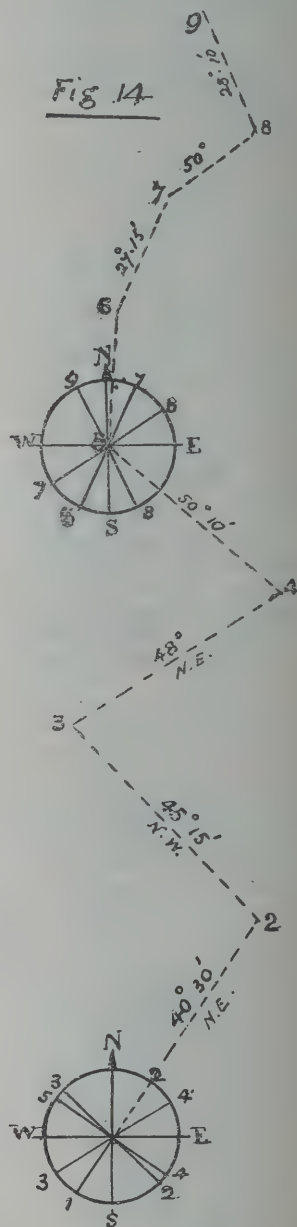
#### LAND SURVEYING.—VII.

##### THE THEODOLITE AND PRISMATIC COMPASS.

IN taking an angle there are two methods that are in use. The first and most common method is to measure the angle between two objects or between two lines, irrespective of the meridian. The horizontal limb being level, unclamp the vernier plate and set the arrow of the vernier to  $360^\circ$ , or zero, carefully adjusting the same by the microscope and the adjusting screw. Clamp the instrument to the lower limb. Turn the instrument to the left of the two stations till the cross-wire of telescope cuts the pole or object. Fix it by the lower clamp screw, adjusting it to a nicety by the tangent screw. Unclamp the vernier plate and turn the telescope round till the wire cuts the second pole or object. Then, again clamp and adjust the vernier plate, and read off the angle by the vernier. To insure accuracy, read off the angle with the other vernier, and the mean or half sum of the two angles is the correct one. Repeat the operation if necessary.

The second method is to take the angle from the magnetic meridian line to the chain line. In this case, the zero of the vernier plate is set to the lower limb at  $360^\circ$  and clamped; the instrument is then moved round till the north end of needle points exactly to  $360^\circ$  in the box; fix it by the clamp screw. Loosen the clamp screw of upper plate, turn the telescope till the cross wires cut the object, then read the angle as before. Repeat the operation, and take the mean of the two readings. Care is necessary to take away all metallic objects from the neighbourhood of the instrument so as to avoid attraction, which would vitiate the results of the observation. We shall give an example of surveying on the meridian plan in our next article; in the mean time we may describe another very useful instrument used in surveying which has already been noticed—the prismatic compass. This

is a circular compass box with floating card attached to a magnetic needle, divided into quarter or half-degrees. On one side of the rim is the prism through which the surveyor looks, on the opposite side is a folding sight with wire. The vertical wire of this sight vane and the division on the card appear together on looking through the prism, and the coincidence of the wire and any particular division on the card denotes the bearing of the object the wire bisects, or the angle of line of sight with the direction of the needle. A mirror hinged to the sight vane, and sliding on it, can be placed at any angle for the purpose of reflecting any object



at a different level to the ground. There is also a spring for steadying the card before taking a reading. The instrument is held up horizontally before the eye of the observer, or fixed on a tripod stand. The prism is raised in its socket till the divisions on the card can be seen through it. Then turn the instrument round till the wire of sight cuts the object to be observed. Bring the needle to rest, and read the division of card coinciding with the sight wire, which will give the magnetic bearing of the object. The same operation can be repeated on another object, and the angle between them found. It must be observed that the figures on the compass card are reversed, so that they may be read right when seen through the prism which reverses them. The magnetic meridian makes an angle of  $20^\circ$  with the true meridian of London—the



is, the north of compass is now west of the true north. This angle varies at different places and times. The compass clinometer combines the prismatic compass and a clinometer for reading vertical angles, and is a useful modification. The manner of surveying and plotting with the compass we shall now describe. Let us suppose we have to take the survey of a road or valley between hills in which there are many bends such as we described, p. 166. We set our instruments up at the commencement of line 1 and 2 (Fig. 14), and observe the deflection of its direction from the magnetic meridian, having previously placed poles at each of the angles 1, 2, 3, 4, 5, 6, 7, 8, and 9. This reading 1 and 2 is  $40^{\circ} 30'$  north-east, which is put down; the measurement of the line is taken, and the instrument again set up on station 2, where the bearing of line 2 and 3 is in the contrary direction, the wire in the sight vane coinciding with  $45^{\circ} 15'$  north-west. This line being measured and the angle entered, the angle is next taken at station 3, the bearing being again reversed, reading  $48^{\circ}$  north-east. In a similar manner angles are taken at stations 4, 5, 6, 7, 8, and 9, the several readings of which are indicated in the diagram. For rapid surveying and for filling-in previous work in the field the compass is especially useful. The plotting is a repetition of the procedure in the field, only in this case a protractor is used instead of the compass. First we draw a vertical line to represent the magnetic meridian or north and south points. We begin at station 1. A circular protractor, preferably of cardboard, is placed over the station, the centres coinciding. The north or zero point is placed on the line through the station representing the meridian with the  $180^{\circ}$  over the line on the south. Fix or weight the protractor in this position, and prick off with a point 1 and 2 or the line  $40^{\circ} 30'$  north-east; 2 and 3 or the line  $45^{\circ} 15'$  north-west; 3 and 4 or the line  $48^{\circ}$  north-east; 4 and 5 or the line  $50^{\circ} 10'$  north-west. Taking up the protractor, straight lines are drawn through the centre as in the diagram. Next lay off the first line 1 and 2 by plotting its length from the field-book. Place the parallel ruler on the next line 2 and 3 and draw the next chain-line parallel thereto from point 2 and of its proper length. From 3 the parallel of 3 and 4 is drawn; from 4 that of 4 and 5, each being plotted to its length. At 5 the protractor may be again set and the lines of direction pricked off as before from the field-book; the repetition of this operation being necessary to avoid complication of lines in the first diagram. Hence we prick off the lines 5 and 6, 6 and 7, 7 and 8, 8 and 9, and afterwards draw lines parallel to each in order of their proper length, which completes the traverse.

The larger the protractor is made the more accurate the result will be: one a foot in diameter is not too large for an extensive survey drawn to a large scale; each quadrant may be divided by lines into 10 minutes. For great accuracy we should of course recommend the theodolite; but where the details of a survey are not numerous, and a large tract of country is gone over, the compass method of taking angles is to be preferred, as being more rapid and less irksome to the surveyor. The instrument is readily set up, there are no troublesome adjustments to make, and no back readings, as when the reverse has to be plotted with great nicety.

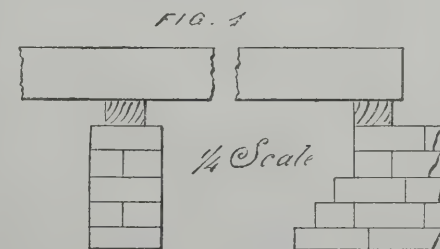
The way to use the theodolite in traversing is: ranging rods are put up at all the points in the former case. At station 2 the rod is taken out, and the instrument is set up exactly over the hole by spreading the legs out equally till the lower parallel plate is horizontal. The plumb bob is made to hang over the hole, from which the pole was withdrawn. The bearing 2-1 is taken with regard to the true north. Clamp the upper and lower plates together, and read the bear-

ing. Taking hold of the rim of lower plate, turn the instrument gently round till the telescope points to station. Clamp lower plate, and observe cross-hairs till they cut the pole by tangent screw. Release the upper plate, and turn instrument round to point 3, taking care to do it steadily, and not to overshoot the mark. Look through telescope, and bring hairs to coincide by clamping the upper plate and using the tangent screw, and read off bearing upon the same vernier. Unclamp the upper plate, and turning instrument again to pole 1, read again the bearing and repeat the operation towards 3, comparing the bearing in each case with the former one. If they agree, the observation is perfect; if the reading upon one of the stations differs from the first observation, the vernier must be set afresh and the observation taken again. When correct, the instrument is taken to station 3 and adjusted as before. Look to the bearing from station 2 and add  $180^{\circ}$  to it, and setting the plates, the operation is again repeated. Suppose, for example, the bearing 2 to 3 is  $45^{\circ} 15'$ , the opposite bearing 3-2 will be  $45^{\circ} 15' + 180^{\circ} = 225^{\circ} 15'$  to which the upper plate is set. In other words, if the original bearing is less than  $180^{\circ}$ , add that to it; if greater, subtract  $180^{\circ}$  from it. The same operation of checking back is required at every station, the plates being set to the back reading, clamping this upon the back rod and turning the instrument to the next forward station. By this method of proceeding each bearing or direction has a direct reference to the meridian; the lower plate being clamped or fixed, the upper plate revolves and measures the angle. Most surveys are made in relation to the magnetic north, the variation of the needle from the true north being laid down upon the plan. In our next we shall proceed to show other applications of the principle of the meridian system of surveying.

#### CARPENTRY AND JOINERY.\*

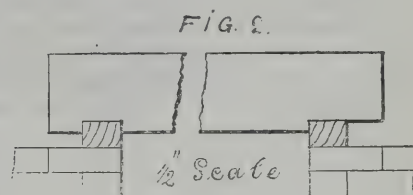
IT is intended under this heading to give a series of articles, which are the result of practical experience, and which, it is believed, will be of service to the apprentice, and it may be that the journeyman and others—perhaps even architects—may derive a few hints which will be of value.

One of the first calls upon the carpenter and joiner in the erection of a house after the ground has been "hoarded in," is "to lay a floor of joists." To begin with the basement, and taking notes as we go along from the "Quantities" now appearing in the BUILDING NEWS, by Mr. H. Lovegrove, it is to have joists 6in. by 2in. on sleepers 4½in. by 3in. These sleepers would be laid flatwise on dwarf walls, say, from 4ft. to 6ft. apart; the footings of walls would be used also, upon which to lay sleepers (see Fig. 1) where possible; these

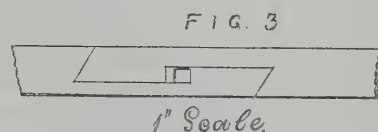


joists would require no trimming; where hearths would occur a battery of brickwork would be built, upon which the hearthstone would be bedded, the joists reaching forward to the hearth in order to support flooring. The usual course adopted in regard to flooring in such a case is to encroach about 1in. each way on the space required for the hearth, lay the hearth on the flooring above where it is to remain, draw a line round it, remove the hearth, and with a saw cut to the line, and the hearth-

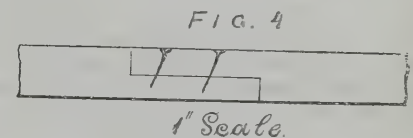
stone will drop in neatly when the mortar or cement bed has been prepared for it. The case of a hard-wood border being required round the hearth will be treated when the flooring is being written about. The other joists are specified in the quantities above spoken of, to be 10in. by 2½in., with "trimmer" 3½in. on wall plates 4½in. by 3in. The wall-plates will be laid flatwise, and as notching is specified in connection with these, it may be done as shown, two ways being diagrammed. The advantage of this is to tie the building more firmly together. The wall-plates require to be scarfed sometimes, if timber cannot be obtained of sufficient length, or, even if obtainable, it is



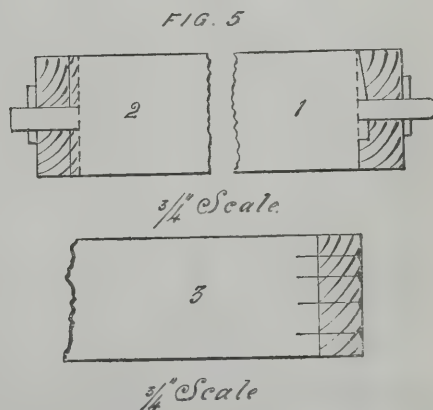
more convenient to use shorter lengths. Scarfing may be done as shown in Fig. 2. Sometimes, indeed, the scarf consists simply in halving and nailing, as shown in Fig. 3. The trimming consists in connecting together by mortise and tenon, or otherwise, the joists, so



as to leave a space where necessary for hearth-stone, stairs, or where light requires to be arranged for through a number of stories, also to avoid joists entering flues. Fig. 5 shows the methods adopted in their order of merit, as they are numbered 1, 2, 3. In the first case



the tenon may be one-sixth the depth of the joist, and in its centre, the tusk entering one-sixth the thickness of "trimmer." The tenon may be wedged or pinned as shown. Wedging and spiking will be necessary in most cases. A templet will be made to mark out the entering



joists, and to try in the "trimmer." A rough gauge will also be made to run on the trimmer for mortising and sinking, or housing the tusk. Square a line on the templet, as indicated by the dotted line on the diagram, which if the templet is tried in the trimmer will show when it is correctly wrought. A hint in regard to spacing joists, rafters, &c.: Place the outer two in position; now from the space between these deduct the number of joists or rafters to be put between, and divide the remainder by a

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number equal to the number of joists or rafters so deducted plus one, which will give the space between each pair of rafters or joists; as, for example, the space between two joists is 13ft., deduct from this 2ft. 1in., or ten joists of 2½in., remainder 10ft. 11in., divided by 11, being one more than the number of joists gives 11½in. as the space between each pair of joists. This principle, when thoroughly understood, is capable of very wide application. In the second method of trimming, the tenon may be one-fifth the depth of the joist, or even the tenon may be square, that is, equal to the width of the joist each way; in this case 2½in., and housing may be ¾in., just to prevent the tenoned joist from warping. (Housing is the term used when one portion of the work is let into the other, when these parts make an angle with each other, as in the case in question, letting the tread and riser into the string or notch-board. Also in making door-cases the stile is sunk into the

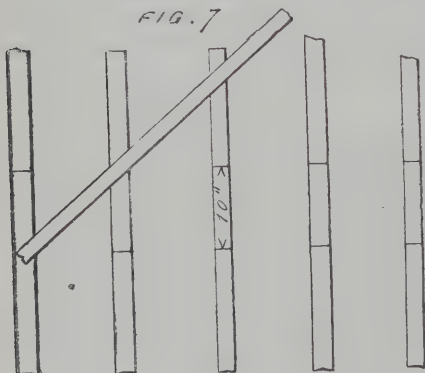
FIG. 6



1/2 Scale

head, the object in most cases being to prevent warping, and in case of shrinkage to prevent the light showing through.) The tenon will be placed in the centre in this method also, and the "trimmer" will be spiked through into joists as well. In the third case, which is only adopted in inferior work, the joists are housed or sunk into the "trimmer" ¾in. or ¾in., and spiked through. An advantage would be gained by bevelling the sinking—that is, sink into the "trimmer" ¾in. on its upper edge and ¾in. on its lower, which, with any tendency to sinking on the part of the joist, would tighten it. Also, in putting in the joist, it thus taking the wedge form, could be put in tighter, and so the floor of joists would be more tightly braced together. When fixing the joists in position, they are side-spiked to the wall-plates with 3in. or 3½in. nails, and a strap or lath nailed along to the top edge near the ends of the joists, but clear of the wall, which prevents their being knocked out of place until the building has been carried up beyond them, when the strap may be sprung off. The joists are to have herring-bone strutting, or "bridging," as it is sometimes termed, the rows of which may be from 6ft. to 8ft. apart (see Fig. 6), according to length of joists. The

FIG. 7



1/2 Scale

only difficulty which may present itself in this will be getting the length and cut of each piece so as to fit exactly. If the joists were equally spaced, to set out on a board two joists in position, drawing lines to show position of struts, a templet made to that would serve to mark for cutting out the struts. But in practice it often occurs that the joists are not always equally spaced; so what is done is to draw a line across the joists where the strutting is to be, square down each side of the joists so as to have a guide for nailing the struts at the bottom edge of the joists. Now from the line which has been drawn across the

top edge of the joists mark off at each wall and on the joists a distance equal to the depth of the joist (in this case 10in.), and draw another line parallel to the first. The next step is: begin at one side of the room, take a piece of strutting, place it across two of the joists, being those nearest the wall, and guided by the lines drawn across the joists, place it in a similar position to what it would occupy when nailed up only at right angles, and with pencil in hand mark the piece of strutting underneath by running the pencil against the joist, and its point marking the strut at the same time. Leave the trace of the line on in cutting with the saw, and it is ready to nail up. Make with the peen of the hammer two dents at each end for the nails; now nail it in its place, taking care to nail it at the lower edge of the joist first. Fig. 7 explains getting the cuts.

In continuing, it must be observed that the struts must be nailed opposite each other at any given edge of the joist—that is, two struts abut against each other with the joists between. By this means the joists are kept from warping, and the floor of joists is tied together upon the principle of the lattice girder. It may be necessary if the joists have sagged (sunk) to lay pieces across underneath them and prop these pieces up until the joists are level; put in the strutting and remove pieces and props. If only one or two joists are sagged they may be levered up until the strutting is put in.

### PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—IX.

By HENRY LOVEGROVE, F.S.I., Surveyor.

CONSERVATORY—JOINERY (continued).

ft. in.	ft. in.	
2 10	7 3	2in. deal door, the lower part in one panel moulded both sides, the upper part sashed for glass with extra wide bars and small squares, the top rail circular to segmental head from drawing-room.
	1	Pair 4in. butts.
	1	Lock as before.
2 1		9in. brass barrel bolt.
12 9	1 0	9 0
	3 6	42 0
	2 7	3 3
	3 2	
2 1		Iron dowels and mortises in fir and York stone.
	15 3	5 9
	4 1	
	4 0	
	15 11	
	4 0	
2 1		Sets finger plates.
6 1	3 2	Wood fixing slips.
	7 6	23 9
	14	
	1	
2 1		Pairs 4in. butts.
12 9	9	6in. mortise lock.
	1 0	9in. iron barrel bolts.
	3 6	21oz. glass in one square each.
12 3	42 0	Deal beads as before.
	3 2	2in. moulded fixed fanlight with radiating and concentric bars semicircular measured net.
	1 7	5 0
	1 5	
	7	10
4 1	0	21oz. glass in one square.
	8	
	2 0	2 8
	1 0	Add do.
4 1	6	Circular cutting and risk on glass.
4 2	7	4 0
4 2	7	Add do. other squares.
	1 4	2 0
	2 0	Add do.
4 1	0	4 8
4 2	6	Raking, cutting, and risk on do.
	7 9	4 8
	5 8	Deal beads as before.
2 1		Add do.
	4 0	Do. circular.
	6	Add do.
2 7	9	4 0
		Add do.
		2 0
		5in. by 4in. deal wrought, rebated, and moulded frame.
		Do. circular to semi-head and keys and wedges as before.
2 1		Iron dowels and mortises in fir and York stone.
	4 0	4in. by 3in. fir, wrought, twice rebated, twice beaded, weathered and moulded transom.
6 1		Wood bricks as before.
		Deductions in brickwork and arches, &c., taken elsewhere.
13 2		
	9	
	6	4 11
13 2		Fir bearer.
2 0		
26 4		Planing on fir.

ft. in.	ft. in.	
2 1	12 11	York stone templates, 9in. by 9in. by 4in., thick tooled.
2	4 ½	Fir wall plate.
11	3	2 5
	14 9	Fir framed joists.
	9	30 5
	3	
	6	CONSERVATORY.
	19 yards.	The woodwork to be put together in white lead and pinned with oak pins.
	Ends timbers built in in cement.	Sup. cement concrete 7in. thick filled in between joists measured over surface.
172 6	43 2	
23 5	30 4	Cube Red. Corshill stone and setting in cement.
	66 8	Sup. Bed and joint.
	10 8	Plain face.
	2 7	Sunk face.
		Circular do.
		10 8 Circular stopped sunk face
		2 7
		Cube fir framed.
11 0	12 11	Bressummer bolted together.
	172 6	Sound boarding and fillets.
	43 2	1½in. deal casing to iron.
		R.W. and point flashings in cement.
15 6	8 9	Do. stepped.
		Boring fir for ¾ bolts.
6 0	28 0	Tongued and staff bead angle in 1½.
		Scribing 1½in. deal to brickwork cross grain.
	6 2	
		Run. Rebate 4in. girt.
13 9	6 9	Do. stopped.
		Sup. 6in. red tiles and laying and jointing in cement.
172 6	19 yards.	
		3in. by 2in. deal wrought double rebated and moulded ash bar.
45 0	24 8	2in. deal ¾in. bead planted on.
		Mitres.
	6	Do. 7 by 3 planted on.
	14 0	Ends.
	2	
		Stopped end to sinking.
	2 = 14in.	External mitres to do.
	2 = 8in.	1 = 7in.
		1 = 4in.
		Dowels, mortises, and cement.
8 3in.		York stone templates 9in. by 9in. tooled and built in in cement.
2		
6in. by 3in.		fir framed, rebated, and moulded uprights.
4 0	4 by 1½	wrought all round lath.
20 0		Tongued joints.
9		Rounded ends.
2 2½		by 1½ do.
66 10		Tongued joints.
6 3in. by 1½in.		do.
24 10		Tongued joints.
2		Notchings 5in girt.
1		
2½in. deal, wrought and moulded side lights, with extra wide bars hung to open on butts.		
63 7	3in. do. do.	top light hung.
25 1	2½in. do. do.	fixed light spandrel, measured net
12 2	1½in. deal, wrought tongued matched and V-jointed boarding in narrow widths as ceiling.	
64 2		
		Run labour scribing 3in. to brickwork.
8 6		Do. splayed edge on 3in.
15 2		Rebate
3 5		
9in. by 2in. deal, wrought, splayed, and moulded lower edge, pitching piece spiked to wall.		
14 8		Ends scribed.
2 4in. by 3in. fir wrought framed rebated and moulded frame.		
8 6	7in. by 3in. do.	
15 2	9 by 3 do.	
8 6	4in. by 3in. wrought framed rebated, and twice hollow moulded transom.	
7 0		
4½in. by 3in. fir framed and wrought all round bearers.		
10 0		Wrought and rounded ends.
6		
		Mouldings.
12in. by 3in. deal moulding as cornice planted on.		
2 4		Moulded and tongued angle.
1		Ends scribed to brickwork.
2	8in. by 4in. deal moulding planted on.	
20 8		Moulded and tongued angle.
1		Ends scribed to brickwork.
1		Do. to stone corbel.
1		Nothing in moulding.
		6in. girt
		1



6in. by 4in. moulding planted on.	
8 3 Splayed ends.	
2	
6in. by 4in. fir wrought framed, rebated twice, beaded and weathered transoms.	
20 3 6in. by 4in. fir, wrought framed and twice moulded rafters.	
26 3	
6in. by 6in. fir, wrought all round, framed, rebated, and beaded posts.	
13 0 6in. by 6in. fir, wrought framed, twice rebated and twice beaded, do.	
20 0 6in. by 6in. deal, wrought, framed, grooved, and twice beaded arch piece, circular on lower edge.	
13 0 = 4	
6 0 = 2	
7in. by 7in., wrought all round, framed and three times rebated, and twice beaded posts	
4 6 2 1/2 in. brackets	
4 do. do.	

OAK.

5in. by 4in. strp. sunk, weathered, and throated sill.	
20 0 Notchings in do. for posts	
9 Wrought fair ends to do.	
1in. by 1/2 in. galvanised iron tongue and groove in oak, and red Corshill stone and white lead.	
20 0 Bedding post against brickwork, and pointing in cement.	
13 0 Pairs 4in. wrought iron but's.	
6	
Elsley's patent rack fastening for opening and closing set of three side lights, total lengths of light 13ft. 8in.	
1 Do. for two lights 5ft. 9in. long	
1 Do. top lights about 15ft. from ground	
2	
Lead in flashings.	
5lb.	
20 6 Labour welt on 5lb. lead.	
32 8 21 9 Labour dressing 5lb. lead into iron eaves-gutter.	
53 1	
265 21 9	
2 1 13	
Close copper nailing.	
23 3 Open do.	
21 9	

SMITH.

4in. cast-iron eaves-gutter jointed in red lead and screwed to woodwork.	
24 0 Extra to stopped ends.	
2 Outlet with nozzle cast on.	
1 Extra to angle.	
1	
3in. wrought-iron screw bolts.	
6 0 Sets heads, nuts, and washers.	
6	
GLASS.	
21oz. sheet glass and glazing.	
1 0 2 0	
7 6 1 1	
2 0 1 1	
11 8	
Raking, cutting, and risk do.	
6 5	
26oz. sheet glass and glazing in squares under 2ft.	
36 10	
16 3	
53 1 3-16 rolled plate-glass and glazing in skylight.	
3 9 4 2 7 9	
26 3 29 2 54 3	
Lead quarries and tinted glass p.c. 3s. per foot superficial and fixing to wood with all necessary saddle bars and copper-wire complete.	
36 9	

THE CONSERVATORY.

The woodwork to be put together in white lead and pinned with oak pins:—	
Eds. Ft.	£ s. d.
19 0 Supl. Cement concrete 7in. thick filled in between joists (measured over surface).....	
19 0 " 6in. red tiles and laying and jointing in cement.....	
0 16 Run. Rake, wedge, and point flashings in cement.....	
0 9 " Do. stopped do. ....	
" No. 5 ends timbers built in in cement.....	
" No. 2 3in. tooled York templates 9in. by 9in. and bedding in cement.....	
11 Cube. Fir framed	
Sq. 13 " bressummer bolted together...	
1 76 Supl. 1in. sound boarding and 5in. by 1in. fillets securely spiked on.....	
Et. 43 Supl. 1 1/2 in. deal casing to bressummer.....	
6 Run. Labour boring fir for 3in. bolt.....	
6 " scribing 1 1/2 in. deal to brickwork across grain.....	
26 " Labour tongued and staff-beaded angle to 1 1/2 in. ....	
64 Supl. 1 1/2 in. deal wrought, tongued, matched, and V jointed boarding in narrow widths as ceiling.....	
64 " 2 1/2 in. deal moulded side lights with extra wide bars hung to open on butts.....	
12 " Do., but fixed spandrel shape, measured net.....	
25 " 3in. do. top light, hung.....	
9 Run. Labour scribing 3in. to brickwork.....	
15 " splayed edge on 3in. ....	
4 " rebate.....	
67 " 2 1/2 in. by 1 1/2 in. wrought all round lath.....	
" No. 6 tongued joints to do.....	

25 Run. 3in. by 1 1/2 in. do. ....	
No. 2 joints	
No. 1 notching, 5in. girt.....	
20 " 4 by 1 1/2 do. ....	
No. 2 joints	
No. 2 rounded ends.....	
25 " 2in. three-quarter bead planted on.....	
No. 6 mitres to do.	
45 " 3 by 2 deal double rebated and moulded sash bar.....	
15 " 9in. by 2in. deal, wrought, splayed, and moulded lower edge pitching piece spiked to wall.....	
No. 2 ends of do. scribed.....	
9 " 4in. by 3in. fir wrought, framed, rebated, and moulded frame.....	
15 " 7 by 3 do. do. ....	
9 " 9 by 3 do. do. ....	
7 " 4 by 3 do. do. and twice moulded transom.....	
10 " 4 1/2 by 3 fir wrought all round and framed bearers.....	
No. 6 wrought rounded ends.....	
4 " 6 by 3 fir do. framed, rebated, and moulded uprights.....	
20 " 6 by 4 do. do. twice beaded and weathered transom.....	
26 " 6 by 4 do. do. do. and twice moulded rafters.....	
13 " 6in. by 6in. do. do. do. and beaded posts.....	
26 " 6 by 6 do. do. twice rebated and twice beaded do.	
19 " 6 by 6 deal wrought, framed, grooved, and twice beaded arch piece circular on lower edge (in No. 6).....	
7 " 7in. by 7in. fir wrought all round, framed, and three times rebated and twice beaded posts.....	
37 " 4in. by 3in. moulding planted on.....	
14 " 7 by 3 do. do. ....	
No. 2 ends do. scribed.....	
22 " 12 by 3 moulding planted on.....	
No. 1 tongued and mitred angle 2 ends scribed.....	
8 " 6in. by 4in. moulding planted on.....	
No. 2 splayed ends to do.	
21 " 8in. by 4in. moulding planted on.....	
No. 1 tongued and mitred angle 1 end scribed to brickwork.....	
1 do. do. to stone corbel.....	
1 notching in moulding 6in. girt.....	
20 " 8in. by 4in. oak stop sunk, weathered, and throated sill.....	
No. 9 notchings in do. for posts.....	
4 wrought fair ends to do.	
No. 4 2 1/2 in. deal wrought and cut brackets 1ft. 6in. by 1ft. 2in. extreme.....	
No. 2 do. 1ft. 3in. by 1ft. 2in. do.	
20 " 1in. by 1/2 in. galvanised iron tongue and groove in oak and red Corshill stone and white lead.....	
13 " Bedding post against brickwork and pointing in cement.....	
No. 9 pairs 4in. wrought-iron butts and screws.....	
No. 1 Elsley's patent rack fastening for opening and closing set of two side lights, total length 5ft. 9in. ....	
No. 1 do. 13ft. 8in. long.....	
No. 2 do. top lights 15ft. from ground.....	
24 " 4in. cast-iron eaves gutter jointed in red lead and screwed to woodwork.....	
No. 2 extra to stopped ends to do. ....	
No. 1 do. to angle.....	
No. 1 outlet with nozzle cast on.....	
18lb. wrought iron in screw bolts and fixing.....	
2cwt. 1qr. 14lb. milled lead and labour in flashings.....	
22 " Labour to welt on 5lb. lead.....	
22 " dressing 5lb. lead into iron eaves gutter.....	
22 " Open copper nailing.....	
23 " Close do. ....	
12 Supl. 21oz. sheet-glass and glazing in small squares.....	
53 " 26oz. do. do. do. ....	
26 " 3/16 rolled plate and do. in 45in. lengths...	
29 " Do. in 50in. do. ....	
54 " Do. in 93in. do. ....	
£7 " Lead quarries and tinted glass, p.c. 3s. per foot supl., and fixing to wood with all necessary saddle bars and copper wire complete.....	
6 Run. Raking, cutting, and risk on sheet-glass	

Carried to summary ...

## VENTILATION OF THE GUILDHALL, YORK.

IN consequence of the success attending the application of Messrs. Robert Boyle and Son's system of ventilation to the Council Chamber at the Guildhall, London, and other public buildings of a similar kind, it has been applied to the Council Chamber at the Guildhall, York, an ancient structure of considerable historical interest, the ventilation of which was very defective, though a number of air-inlets and open extraction shafts were provided, but which, as is usually the case with such rough-and-ready contrivances, had generally to be kept closed owing to the down-draught proceeding from them, rendering the ventilation practically nil, and semi-suffocation the natural consequence.

These defects have been entirely obviated since the application of Messrs. Boyle's system, consisting, in this instance, of two of the

latest improved patent self-acting air-pump ventilators, 30in. diameter, fixed upon the roof, and connected by means of 15in. dia. pipes, with two hoppers placed over perforated panels in the ceiling. This effectively provides for the extraction of the vitiated air, an ample supply of fresh air being admitted through seven of Messrs. Boyle's improved air-inlet tubes, 59in. by 10in. by 4 1/2 in., fixed against the walls in different parts of the chamber.

A valuable feature in this system is that it is perfectly under control, a matter of no small importance in the ventilation of a public building; and that it has proved successful in this, as in other instances where dependence was previously placed upon imperfect inlets and simple open pipes or flues, is evidenced by the following extract from a report received by Messrs. Boyle, with permission to use it, from Mr. E. G. Mawbey, the city surveyor of York, after lengthened experience of the system:—

"I have pleasure in informing you that the ventilation of this Council Chamber, which I have carried out on your system, is very satisfactory, notwithstanding that the room is altogether too small for the number of persons occupying it during council meetings."

This system is not only an efficient, but has the recommendation of being an economical one, and easily applied.

## CHIPS.

A new organ, built at a cost to the donors of £750 by Messrs. Willis and Son, of London, has this week been placed in St. John's Church, Preston, Lancs.

The new railway just made by the Great Western Company between Bodmin and Wade-bridge on the route of a disused mineral line was formally opened on Monday.

Mr. W. H. Smith, M.P., has agreed to formally open, on the 24th or 25th of October, the great South Gare breakwater at the mouth of the Tees, which virtually completes the improvements which the Tees Conservancy Commissioners have been constructing at the Tees mouth during the last 25 years.

The church of St. Olave, York, which has been closed for repairs, was reopened on Sunday. The work carried out consists of the taking down of the plaster ceiling, cleaning and exposing the moulded and panelled oak ceiling, and cleaning and repairing the whole of the walls, and exposing the dressed stonework. It has been executed by Messrs. J. and T. Biscoe, Mr. W. Dennison, and Mr. T. G. Hartley, under the direction and supervision of Messrs. Demaine and Brierley, architects. It is proposed next year to put new oak ceiling on the aisles, to further improve the nave roof, and to repair the glazing.

At the Carlisle Consistory Court last week a faculty was granted for the restoration of St. John's Church, Keswick, including additions to and re-roofing of the chancel, reseating, and the rebuilding of the pulpit.

The Art Gallery Committee of Manchester have purchased from the present Autumn Exhibition in that city the following three works for the Permanent Collection:—No. 371, "Autumn," by Mr. Alfred East, exhibited at the last Royal Academy; No. 375, "A Fair-haired Slave, who made himself a King," by Mr. C. N. Kennedy; and No. 376, "Britannia's Anchor," by Mr. David Murray, A.R.S.A.

The tower of the parish church of Long Compton, Warwickshire, is undergoing restoration. Mr. John Clarke, of Compton, is the contractor.

The free libraries at Salford were opened this week, for the first time, on a Sunday. The attendance of visitors and readers was very small at all four institutions.

New Wesleyan schools at Silloth, erected from the designs and under the superintendence of Mr. T. Tremble, were opened last week.

The church of St. Michael and All Angels, Queen's Town, Cape Colony, is about to be extended by the addition of north and south transepts with porch, and raising of central tower. The nave was erected in 1882 from a design selected in competition, and furnished by Mr. W. H. Reid, of Cape Town, from whose designs the present works will be carried out.

Major Du Cane, one of the Local Government Board Inspectors, held an inquiry at the Coffee Tavern, Maryport, on Tuesday week, with regard to an application made by the Cockermouth Rural Sanitary Authority to borrow £2,200 for the construction of sewage works at Ellenborough, Nether-ton, and Grasslot.



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## ILLUSTRATIONS.

DESIGNS FOR WORKMEN'S DWELLINGS.—A CORNER IN THE STUDIO OF SEYMOUR LUCAS, A.R.A.—PUBLIC BATHS, ST. GEORGE'S, HANOVER-SQUARE.—STOKESAY CASTLE, SHROPSHIRE.—BARFRETON CHURCH, KENT.—HYDE PARK MANSIONS.—SKETCHES AT THE EXHIBITIONS OF WORKS IN WOOD AND THE HOME ARTS ASSOCIATION.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

MODEL VILLAGE, AINTREE, NEAR LIVERPOOL. SELECTED DESIGN.

For description see page 324.

A CORNER IN THE STUDIO OF SEYMOUR LUCAS, A.R.A.

OUR illustration of this week represents the studio at "New Place," Woodchurch-road, West Hampstead, the residence of Mr. J. Seymour Lucas, A.R.A. The studio is on the ground floor of the house, and is 40ft. by 20ft. (exclusive of the bay window), and 15ft. in height. The room is oak panelled to a height of 8ft., and has a gallery at one end used for storing artistic properties. The panelling is partly old, and was made complete and the gallery formed with new work. The studio is hung round with armour, buff jerkins, swords, and arms, and contains a valuable collection of old costumes and furniture used by Mr. Lucas in painting his pictures. The ante drawing-room has a large bay window, similar in style to those at Haddon Hall, and in the dining-room is a fine terracotta chimney-piece of the time of William III. It is proposed to fix in the entrance to the house the doors, architraves, and hood removed from Fairfax House, Putney, illustrated in the BUILDING NEWS, June 29, 1888, and in Vol. XXXVII. page 548. There is a second studio on the upper floor of the house, used by Mrs. Seymour Lucas, whose pictures are well known. The house was built by Messrs. Mansbridge; but in any subsequent work, including the finishing of the studio, Messrs. Lee Brothers and Pain have acted as architects to Mr. Lucas.

PUBLIC BATHS AND WASHHOUSES, FOR THE VESTRY OF ST. GEORGE, HANOVER-SQUARE.—THE ACCEPTED DESIGN.

The elevation in Buckingham Palace-road is simple in treatment, the materials proposed being red bricks and Corsehill stone; that in Ecclestone-street is of the plainest character. The first-class baths and executive departments are arranged to front Buckingham Palace-road, and the second-class baths and washing departments are placed at the Ecclestone-street end of the site. Separate entrances are provided in each instance; these are so arranged that two pay boxes only are required. That in Ecclestone-street is, however, subdivided, so that it may be used as desired according to the pressure of work. The first-class swimming bath is 90ft. long by 30ft. wide, having a lantern roof; there are dressing boxes fitted up round the sides, with a gallery over; an attendant's room and necessary conveniences are provided. It is approached by a spacious hall and vestibule; the pay box is centrally placed. Adjoining to it is a waiting room and a committee room, for use at entertainments or at other times. From the hall a well-lighted staircase leads to the private baths on the first floor; these are twenty in number. The women's first-class baths are entered by a corresponding door to that on the men's side, and by a similar staircase also, they being on the first floor. The

board room, anteroom, and adjuncts are placed on this side of the building. The superintendent's apartments are placed on the second floor, and consist of six rooms, with the necessary conveniences. The first-class baths are lighted and ventilated by windows on one side, and by lantern lights over the back portion of the rooms; the staircases are lighted by similar lanterns, which also assist in lighting the vestibules. Pass doors are arranged for supervision, and also to render the second-class bath (swimming) available for the use of women. The men's department (second class) is entered by a vestibule with waiting room leading to the swimming bath, 57ft. long by 33ft. wide, also by a staircase to the private baths on the upper floor. The women's baths (second class) are approached by a staircase (adjoining the pay box) leading to the upper floor also. The public laundry is situated over the second-class baths and first-class swimming bath, and is provided with all the necessary appliances. There is a waiting room on the ground floor, with staircase and lift. The house, laundry, and engine room are placed above the ironing room, and over this is placed the large tank for supplying water and also fire hydrants, which will be fixed in convenient positions. The ventilation of this department will be assisted by the spaces between the shaft from boilers and the cylinder therein. There are four boilers in the basement, to be used as required, with engineer's shop, well lighted by pavement lights and glass roof over areas. Messrs. Lee and Smith are the architects.

## STOKESAY CASTLE, SHROPSHIRE.

THE uncommonly picturesque group of buildings, with its irregular polygon of a tower, known as Stokesay Castle, is with good reason a favourite subject for the sketcher and architectural student, while its connection with the Vernons of Haddon Hall, Derbyshire, of which we have lately given several illustrations, renders its history somewhat interesting. Otherwise, the records of the place do not specially call for remark. The De Ludlowes owned it before the Vernons, and then it passed to the Earls of Craven. To-day we give two sketches by Mr. T. Locke Worthington, A.R.I.B.A., taken by permission from his "Remnants of Old English Architecture," just published and printed for him by Messrs. Sprague and Co., of Cannon-street, E.C. Before glancing at this admirable brochure, it may be well to furnish a few particulars concerning the subject of the drawings shown herewith as samples from the volume they represent. Two other sketches in line of the same building are included in the folio, but the views we give are from coloured studies. At the Conquest, Stoke was held by Ældred of Eddic Sylvaticus, and after his rebellion it was bestowed on Roger de Montgomery. *Stokes*, which is the Anglo-Saxon for a village, is the word used in Domesday to describe the holding of Stokesay, and Walter de Laci is recorded as the owner. The derivation of its present appellation is taken from *Stokes* and *Say*, the family name of the possessors of the castle during the reign of Henry I. Theodric de Say gave the church adjoining his Castle to Haugmond Abbey in 1156. It is dedicated to St. John the Baptist, and is filled with old high-backed oak Jacobean pews, that in the chancel being a fine canopied structure; the building shows in Mr. Worthington's upper drawing. Laurence de Ludlow lived at Stokesay in 1281, and about 1290, the date on the plate, he obtained permission to encrenellate the buildings and to strengthen his fortress by walls of stone and lime. The present Manor House, no doubt, was his work, and consequent upon this license, he put up a strong embattled wall round the courtyard; but, save the garde-robe, this wall is now gone. Stokesay forms a delightful combination of half-house and half-castle, with moated entrance, gateway tower, great hall, and courtyard; indeed, Stokesay has been well described as one of the most complete and perfect examples in England of a castellated mansion of the 13th century, comprising, as it does, such excellent details of both wood and stone construction in great variety. The courtyard is an irregularly-shaped oblong inclosure, and is reached through a timber-built gatehouse elaborated with grotesque carvings and rich framings. On the west of this building is the house itself, having

two towers, one at the north end and the other at the south. The latter is the one seen in our lower sketch, and the other, surmounted by a 16th-century timber oversailing story, figures in the upper view, and it faces the churchyard. Lancet lights form the windows to the embattled tower, the openings to the lower floors being contrived obliquely, so as to prevent assailants from shooting their shafts inside the stronghold. The great hall measures about 52ft. by 31ft., and has a paved hearth in the centre. One of its four large windows, overlooking the moat, occurs in our upper picture. The roof is of good open-timber construction, resting on large upright stone corbels with Early English mouldings. In the principal rooms over the cellar in the north wing is a rich 16th-century fireplace of notable character. From its position Stokesay was evidently always regarded rather as a strong domestic residence than intended to be reckoned a serious fortress. During the Civil War it was, however, garrisoned for the king, but was speedily surrendered to the Parliamentarians after but a brief siege. We have given other illustrations of Stokesay Castle in the BUILDING NEWS for September 2, 1881, and March 27, 1885. Turning now briefly to the collection of plates which compose Mr. Worthington's "Remnants," we can but note the diverse character of the studies thus brought together, representing more or less nearly every period of work, chiefly exemplified by subjects existing in the West of England, with one or two bits from Kent, Yorkshire, and Lancashire. The concluding examples of the series are furnished by sketches from France. With a view to classify the material thus compiled, the plates are grouped under the heads of "Early Pointed or Lancet," the "Rectilinear Style," and the generic term of "Old English Picturesque Architecture," describes the remainder, with an epitome of the English Mediaeval styles by way of a preface; following which is printed the late Mr. Edmund Sharpe's table from the "Seven Periods of English Architecture." Wenlock Priory, Shropshire, is more thoroughly illustrated than any other subject, the best practical plate in the book being that showing a detail of the south transept of that beautiful ruin. The plan of the buildings is carefully done, and supplies a useful sheet; but the general elevations are, perhaps, a little too small for more than mere reference. The sketch of the combined columns from the octagonal fountain in the cloisters is indifferently drawn; but the detail study of the Early English foliations which enrich the chancel arcade in St. Mary's Church, Stone, Kent, are delineated with accuracy and appreciation of their beauty. Bolton Abbey and Peterborough Cathedral supply well-known doorways; and from the Mytton Chapel, Bredon Church, Worcestershire, some very useful studies of the beautiful windows there are given. A slight sketch from Pershore Abbey follows, and then comes a painstaking view of the celebrated florid oak stalls on the north side of Manchester Cathedral choir; from which church Mr. Worthington also gives us a sketch looking from the Derby Chapel into the retro-choir. Some of the misereres from the chancel stalls are carved with eminently grotesque subjects, in a few of which the fox and the goose, Reynard as a schoolmaster, or in the character of a reader, supplies a favourite source of ingenuity and fun. Chetham College dining-hall screens are drawn to scale; and the next plate is occupied by a general view of the central tower of Chester Cathedral from the cloister garth. A typical buttress in an outline sketch from Haddon Hall shows the class of work the author has studied; and the succeeding Ludlow sketchbook sheets illustrate equally familiar specimens of Domestic building from Shropshire, such as "The Feathers," and old houses in the "Bull Ring." Much Hall, Wenlock, and the "Old Vicarage," Prestbury, are instances, too, of the same class; while Harvington Manor, Worcestershire, is shown from a water-colour illustrating an unpretentious bit of timber building. The Norman staircase leading to the Registry, Canterbury Cathedral, an ancient friend often represented, and the north aisle of the choir at Cartmell, Lancashire, are interposed at this part of the volume, and then follow old houses of late date in Vine-street, Bristol, and in a by-lane, Gloucester. A sheet



of sketches from Evesham, Worcestershire, are autographic pocket-book studies in the streets of that ancient town, giving a view of the place from over the Avon, and another of the celebrated Bell Tower. The Market-place, Peterborough, and "Tom Tower," Christ Church, Oxford, are to a more useful scale, and the following sheet to nearly full size, illustrates a carved cap from Southwell Minster Chapter-house arcade. The trifles from Chartres and little bits from Laon and Senlis have the credit of being "drawn on the spot," a qualification, however, which seems to reflect upon some of the other and more serious drawings in the book, which may not (by mere chance perhaps) bear such credentials. The house in *Marché au Blé*, Reims, has a very nice front, suitably treated in vertical timberings richly detailed. The Tower of St. Vincent, Senlis, here shown by a tinted view, is a well-known *clocher* often imitated, and the accompanying drawing in outline of the western doorway of Senlis Cathedral is furnished in scale by two 14th-century figures borrowed from Mr. Lonsdale's "Book of Mediæval Costume." The last plate of the series is a general street view in Rouen on the north side of the cathedral, giving an admirable idea of the more ancient timber houses still to be seen unrestored in the old towns of Normandy. Mr. Worthington's "Remnants of Old Architecture" will add another to the several records of such buildings, and we have yet to learn that there can be too many of such representations of historical examples, for no one can deny their educational influence upon good taste and the pleasure of such souvenirs of the past and its remains.

#### BARFRESTON CHURCH, KENT.

THE proposed restoration of this very interesting church has, as our readers are already aware, caused no little controversy, and we understand that the Archbishop of Canterbury has taken some personal interest in the preservation of the building. The chancel was restored several years ago, and the present work is to be chiefly confined to the nave, the roof of which sadly needs repair. Whether the west wall is contemporary with the north and south walls seems open to question, and no doubt the Later window, which some wish to see removed, is an insertion which has destroyed the symmetrical design of the original west end. The correspondence which has appeared in our pages during the past few weeks has directed public attention to the question, and we can but further the matter by publishing these photographic illustrations, together with a ground plan of the church, which may be reckoned one of the most remarkable Norman buildings in England, calling to mind Ilfley Church, near Oxford; while its beautiful south door reminds one of the celebrated Prior's door at Ely Cathedral for the richness of its sculptures. Patrichbourne, in Kent, is said also to have closely resembled Barfreston, or Barson, as the "locals" call it. The stone with which the walls are built is described as Caen, filled in, of course, with rubble. The probable builder of the fabric was Hugh de Port, Constable of Dover. We know that the manor was given to him after Bishop Odo's disgrace in 1081. Good masons from Normandy had at that time been brought over by Archbishop Lanfranc, Prior Ernulf of Canterbury, and Bishop Gundulf of Rochester, and the Kentish lords, from the evidences remaining, readily found employment for their skill, while Barfreston Church may be taken as a notable example of their work. The singular treatment of the exterior façades has always been a fond subject for antiquarian dispute. The arches below the eastern end are certainly very curious, and seem to have been intended for a plan never quite realised. Some have thought the recesses thus formed by these arches were contrived to serve as burial places for the founder's family. All that is clear is that structurally they do not belong strictly to the wall of the building, being built on to it. Mr. J. P. Seddon is the architect engaged to restore the fabric.

#### 15, HYDE PARK MANSIONS.

THESE buildings are part of a series of similar West-end mansions erected recently in red brick, from the designs of Messrs. Eales and Son, architects, and the particular drawing herewith illustrated was exhibited at the Royal Academy this summer.

#### EXHIBITION OF WORKS IN WOOD.

AT the Carpenters' Hall a short time since there was held an exhibition, and amongst that was an Antique section. Mr. Seymour Lucas lent the interesting old Table with its secret hiding-place. We have seen in more than one of his pictures this table portrayed. The Jacobean Chair was lent by the same artist, and is an interesting example. There is a fine old Armchair from Old Lyon's Inn, and has a coat of arms painted on the top. The carved oak Bottle-holder is interesting. We do not recollect to have met with one of this description before; on releasing the little peg at the back the hinged back falls down, leaving room for the bottle to be inserted, whilst a good solid base precludes the idea of any upset. Mr. Shoppee had a good many oak Chairs on view. Carved ivory crucifixes and wonders in wood carving were included in an exhibition replete with interest, and which we hope to see enlarged on a future occasion.

#### HOME ARTS ASSOCIATION.

THE Home Arts Association annual show and sale of the year's work was on view a short time since at the Albert Hall, and was certainly not up to the standard usually attained, either in quantity or quality. We give a few sketches from articles shown there. The oak Settle was of good design well carved, with four enriched panels in the back, and shaped arms. The angle Cabinet we did not admire so much as some seen at the Association in previous years—it was in oak. The Bellows were also of oak, with a running carved pattern round them, finished off with brass nails and red leather. The Chair is evidently a copy, and very much like some in South Kensington Museum, the leather seat having been adapted from an old Cordovan example. The Ironwork came from Austria, and is to be used, we believe, as a pattern for students to work at. The little carved Frame is very pretty, both in execution and design; and the oak Cabinet, though somewhat Flemish in design, was more solidly put together and better finished off than the rubbish generally imported to this country. The classes at Ashridge, Windsor, and the linen industry from Langdale Valley were well represented. Some homespun Linen we saw had been worked by "Cherry Ripe" Pepper, the little girl whom Sir John Millais painted a few years back. The Pottery was rather better than usual; there were a few very good Barbotine examples from Devonshire. The Repoussé Brasswork was fairly good, and we hope next year the woodwork and carving will have improved, and a better exhibition be the result.

#### CHIPS.

At a meeting held at Garrigill, near Alston, Cumberland, last week, it was decided to take steps to restore and enlarge the ancient chapel-of-ease, in accordance with plans prepared by Mr. W. Hicks, of Newcastle-on-Tyne, the estimated outlay being £1,000.

Some beautiful carving in clunch stone has been discovered in a buttress against the north-east corner of the north transept of Peterborough Cathedral, which doubtless belonged to the Lady chapel, built in 1272 by Prior Pavys and demolished in 1670 to mend the dilapidations in other parts of the building. It consists of arcading, crocketed pinnacles, caps, mouldings, &c., and formed a portion of internal ornamentation. Many stones bear traces of very brilliant pigments. According to the chapter records, Lovin built the buttress in 1698, or 28 years after the destruction of the Lady chapel.

In accordance with a resolution passed at a meeting of the brick trade, held recently at the Cannon-street Hotel, steps are being taken to advance the price of bricks by 20 per cent. The advance is desired for the purpose of covering "the loss from waste and short make caused through the wet season."

The Board of Trade inspection of the Oxted and Groombridge Line took place on Thursday in last week, the inspector being Major-General Hutchinson, C.E., who was accompanied by Mr. F. D. Bannister, the engineer, and Mr. J. T. Firbank, of the firm of Firbank Brothers, the contractors. The inspection commenced at Edenbridge, and was continued through Hever, Cowden, and Hartfield stations on to Groombridge. The new line will be opened about the first week in October.

#### COMPETITIONS.

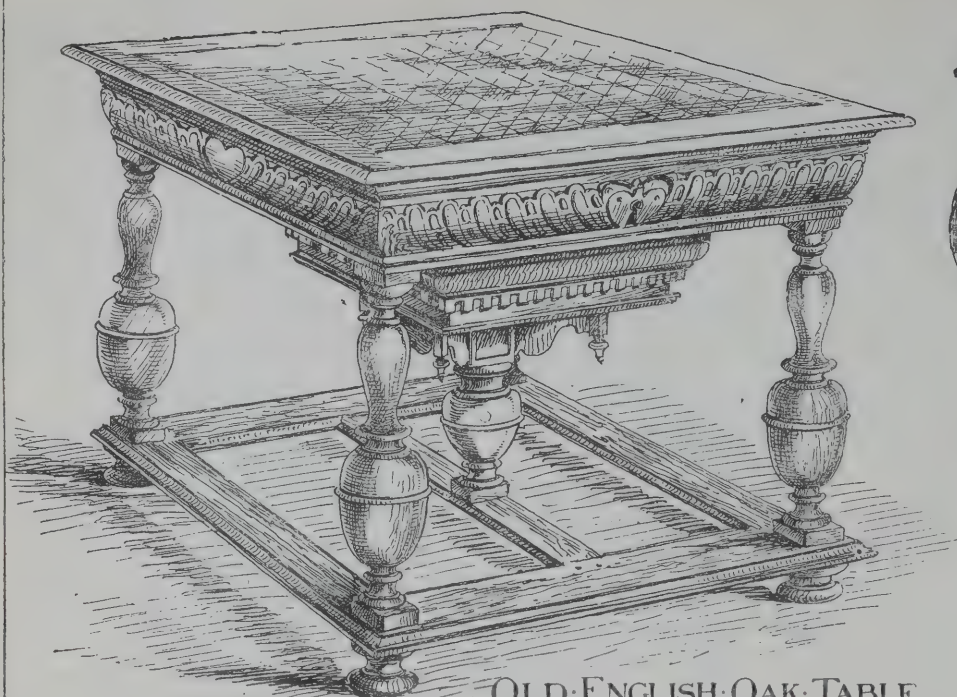
EDINBURGH.—Archbishop Strain has selected for the Roman Catholic Church proposed to be built in Upper Gray-street the competitive plans submitted by Mr. Rhoderic Cameron, 130, George-street, Edinburgh. The style of architecture adopted is a free treatment of Classic Renaissance. The front façade towards Upper Gray-street shows base and middle stories marked by cornices, and surmounted by a pedimented gable. The basement is of polished and moulded ashlar; the upper portions will be of scabbled work. The large west window, which is semicircular in form, is mullioned, and has a moulded sill and architrave. The gable will have a deep frieze and a moulded cornice and pediment, finished with a plain Latin cross. The tympanum of the gable is intended to have a sculptured subject from the Life of Christ in bas-relievo. The plan of the church is an oblong, with semicircular end, forming a chancel and nave, and having a broad passage running up the middle, and an organ gallery over the vestibule. The organ gallery is approached by a stone staircase from the main entrance. In the north-east angle are the sacristy, acolytes' room, and lavatory. In the basement of this block is the heating-chamber. The font will be in the vestibule at the west end. The confessionals at the south side will be divided into closets for priests and penitents, and will have separate entrances from sacristy and church. The area of the church will be seated with pews. The roof of the church is an open-timber one, having the principals, purlins, and rafters exposed. The inside face of the walls—which is divided into bays by pilasters carrying the roof principals—is to be finished in plain plaster. It is, however, intended to decorate it with Scriptural subjects in fresco painting, when finances permit of that being done. The church will accommodate 540 people.

#### ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

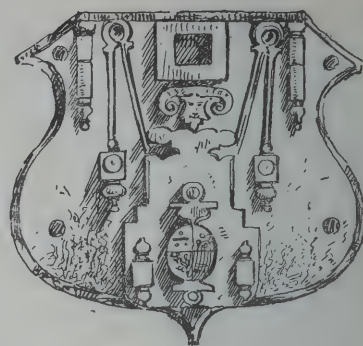
LINDISFARNE PRIORY.—The members of the Newcastle Society of Antiquaries, of the Durham and Northumberland Archæological Society, and of the Berwickshire Field Club held a joint meeting at Bamburgh and Belford on Thursday, and on Holy Island on Friday. Sir William Crossman, the lord of the manor, received the visitors within the ruins of Lindisfarne Priory, and explained to the party the excavations and repairs carried out under the direction of Mr. Johnson, of Newcastle, as architect to the Commissioners of Woods and Forests. An address on the historical and religious associations of the island was afterwards given by Canon Greenwell, and Mr. C. C. Hodges, of Hexham, afterwards gave the architectural history of the church. The evidence showed, he said, that there was a stone church before the present church was begun, and part of that Saxon stone church was still to be seen. He pointed to places where the lower masonry was in irregular blocks, differing from the blocks of stone of above, which were square. This masonry, too, was carried below the level of the Norman church, and was covered with plaster, which was a Saxon and not a Norman custom. The church in which they now stood was built by Edward the Monk, and it remained unaltered until the time of the Dissolution of the monasteries. They had there what they had not in the whole of England—a monastic church of the Norman period of which they could say that the whole of the ground plan remained unaltered. The church followed the outlines of the Cathedral of Durham—being a later adaptation of the same style. From the time of the Dissolution until 1664 it was, he said, used as a storehouse by the Government. In 1728, from a cut which was published at that time, there was much more of it standing than there was now. In 1840, extensive repairs were undertaken by the Commissioners of Woods and Forests.

The Nurses' Home recently erected in connection with the Glasgow Royal Infirmary, at a cost of over £8,000, was formally opened on Friday. It is situated to the east of the main block of the institution, and is four stories in height, containing a large recreation hall and other public apartments as well as 85 bed-rooms.





OLD-ENGLISH OAK TABLE  
LENT BY SEYMOUR LUCAS<sup>ESQ</sup>



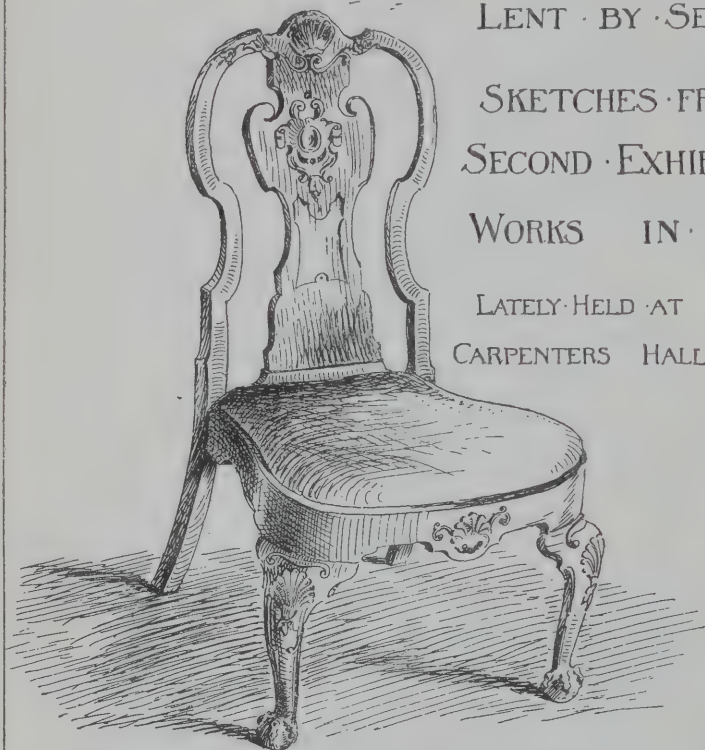
SKETCH OF  
LOCK



KEY TO  
SAME

SKETCHES FROM THE  
SECOND EXHIBITION OF  
WORKS IN WOOD

LATELY HELD AT  
CARPENTERS HALL

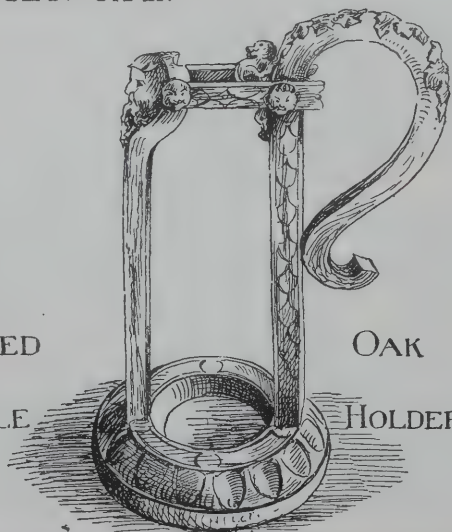


JACOBEOAN CHAIR



CHAIR OF THE BENCHERS  
FROM OLD LYONS INN

CARVED  
BOTTLE



OAK

HOLDER

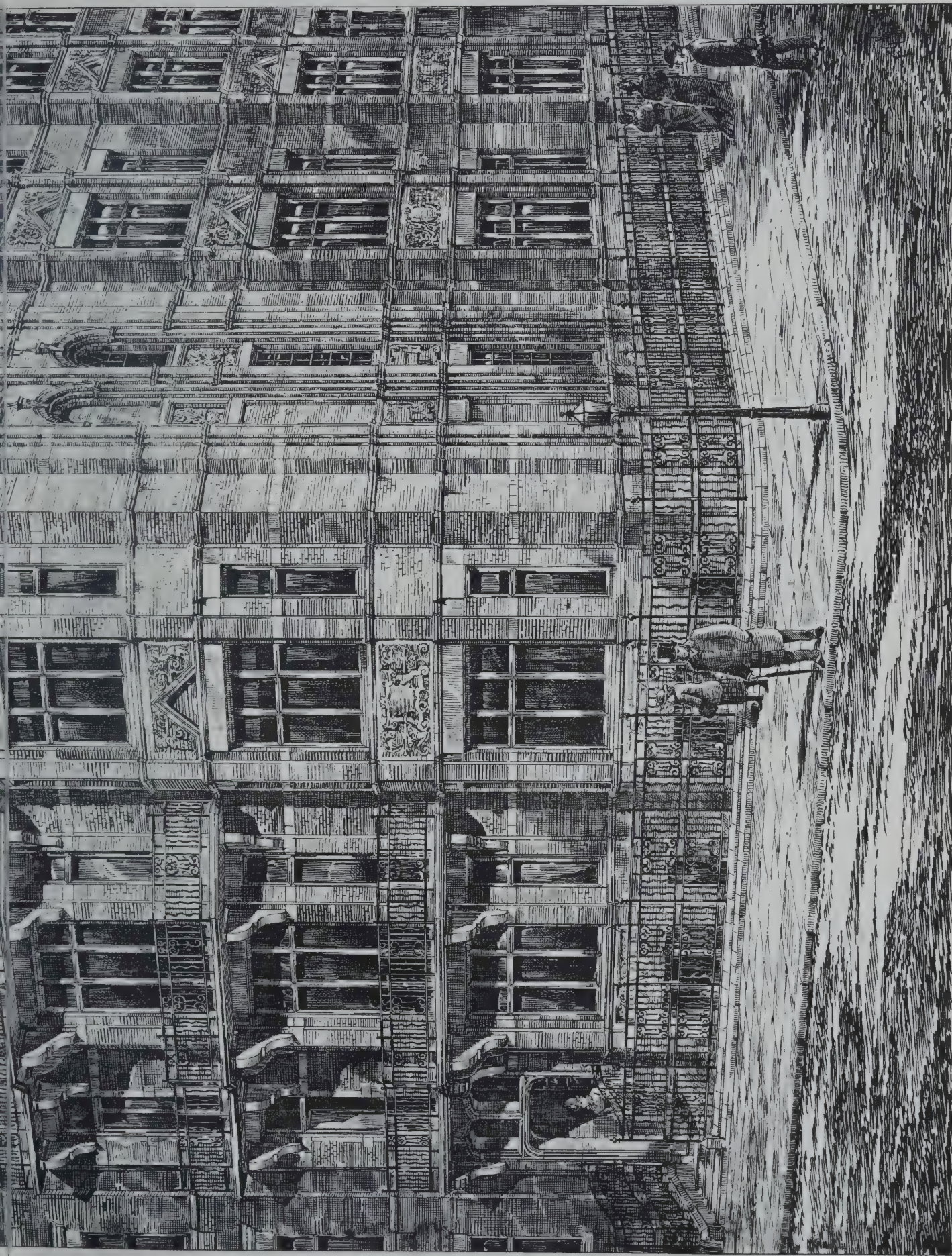












15, HYDE PARK MANSIONS, C. EALES & SON, ARCHITECTS.

Photo-Lithographed & Printed by James Alnman, 6, Queen Square, W.C.

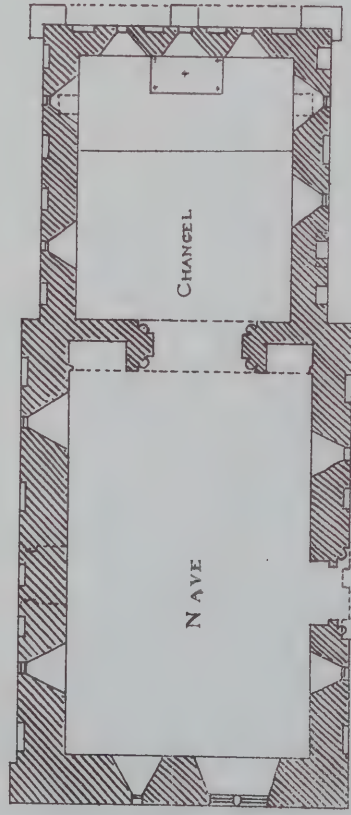




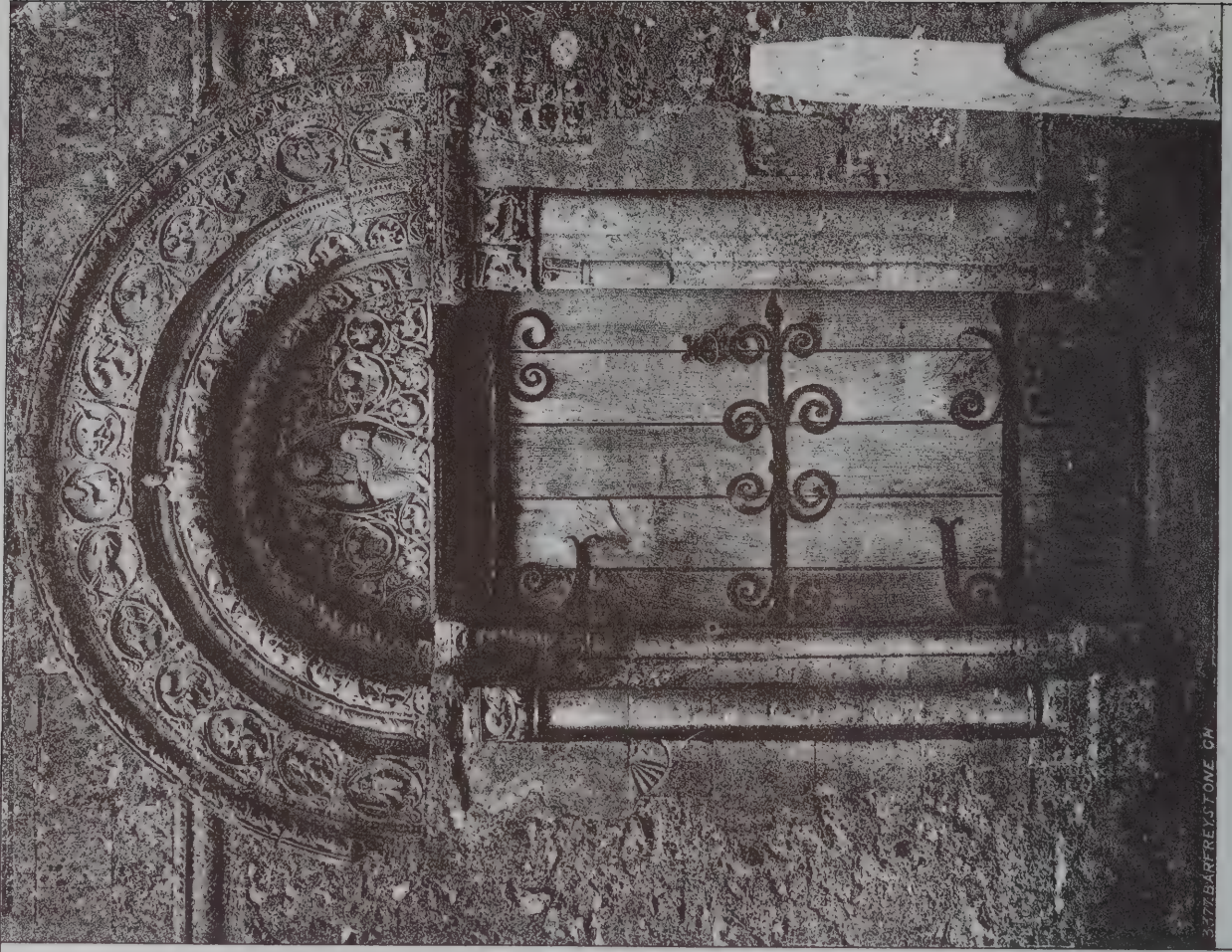
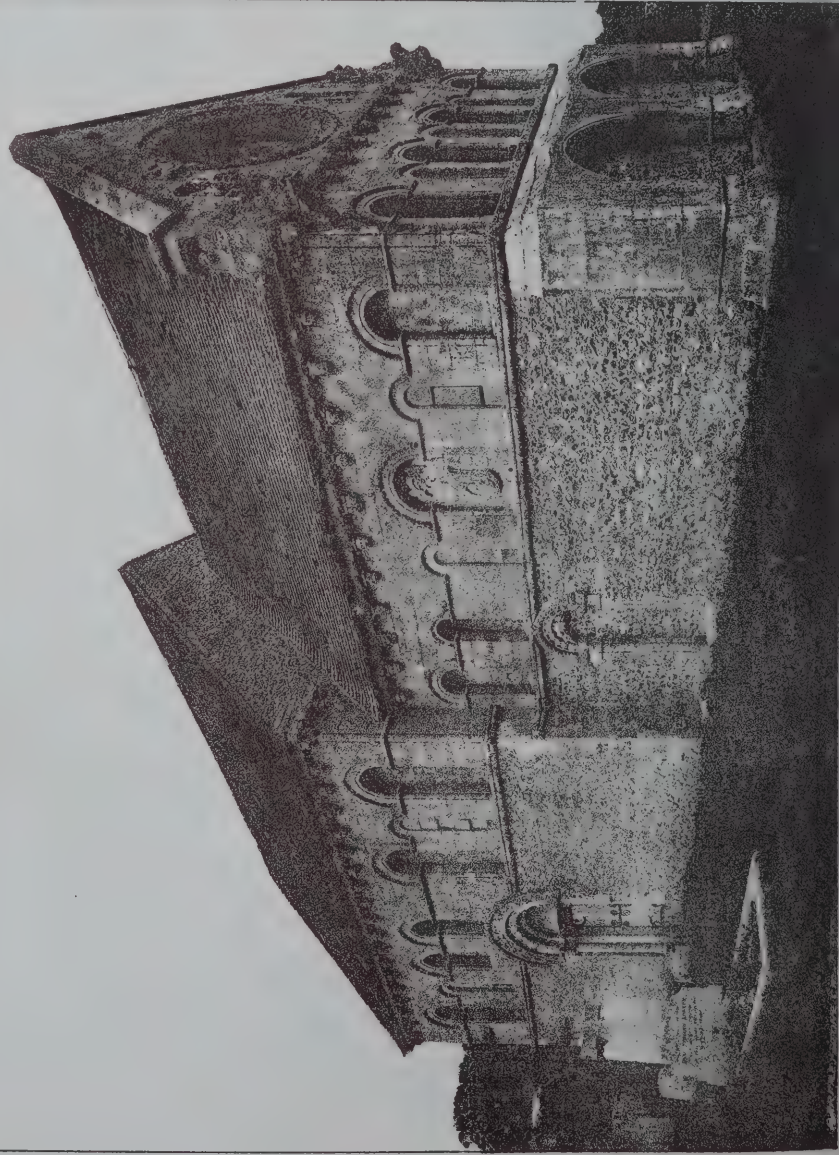








SCALE OF FEET  
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3472 BARFREYSTONE CH







THE BUILDING DEWS, SEP. 7. 1888.



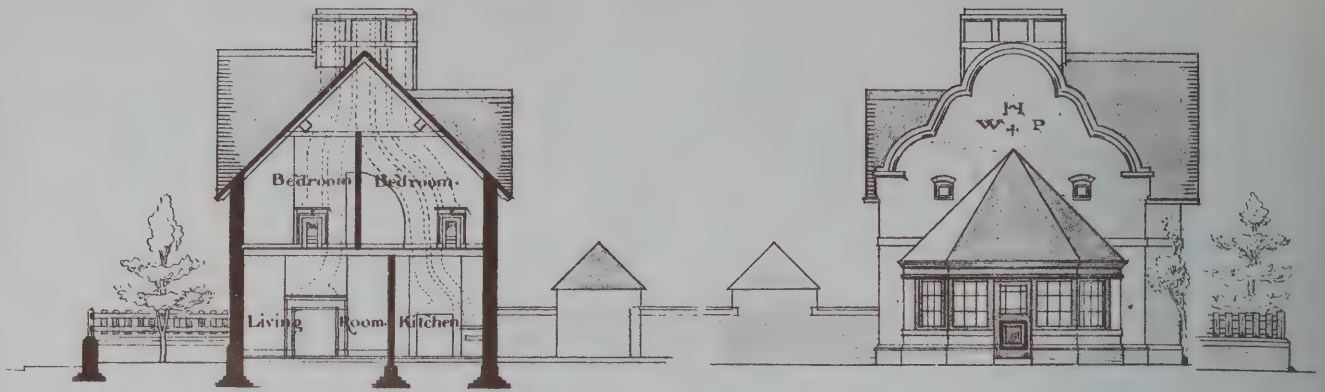






Section on line A.B.

End Elevation.



Front Elevation

DESIGNS for Laying out an Estate  
of Workmen's Dwellings at AINTREE  
for W.P. HARTLEY, ESQ., Anno 1888.

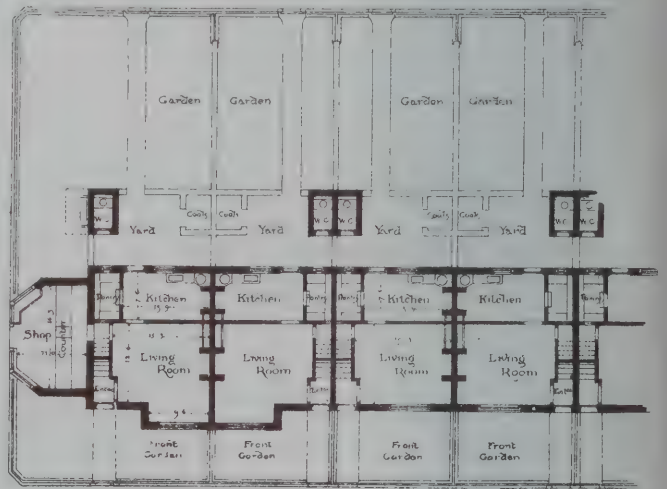
By "SWEET AUBURN."



"A Time there was—ere England's griefs began,  
When every Rod of Ground maintained its Men."



Chamber Plan



Ground Plan



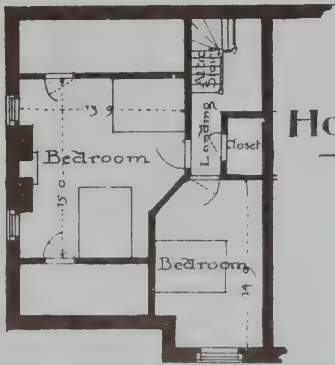
Back Elevation.



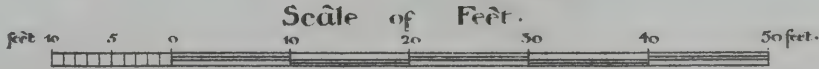
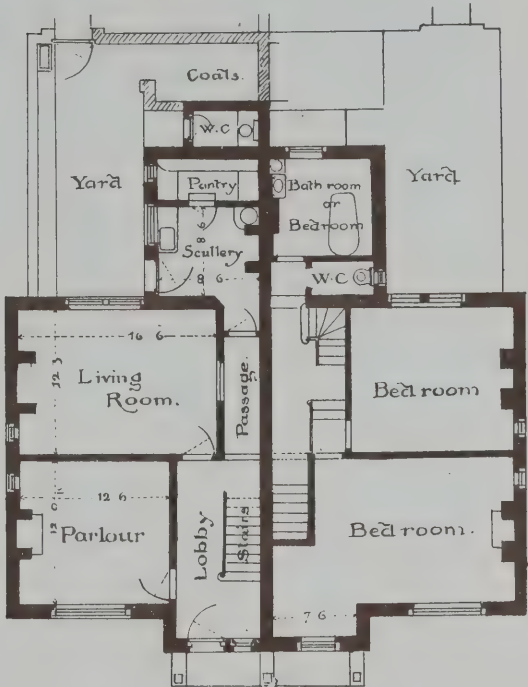
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"A Time there was—ere England's griefs began,  
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Class A  
House Plans







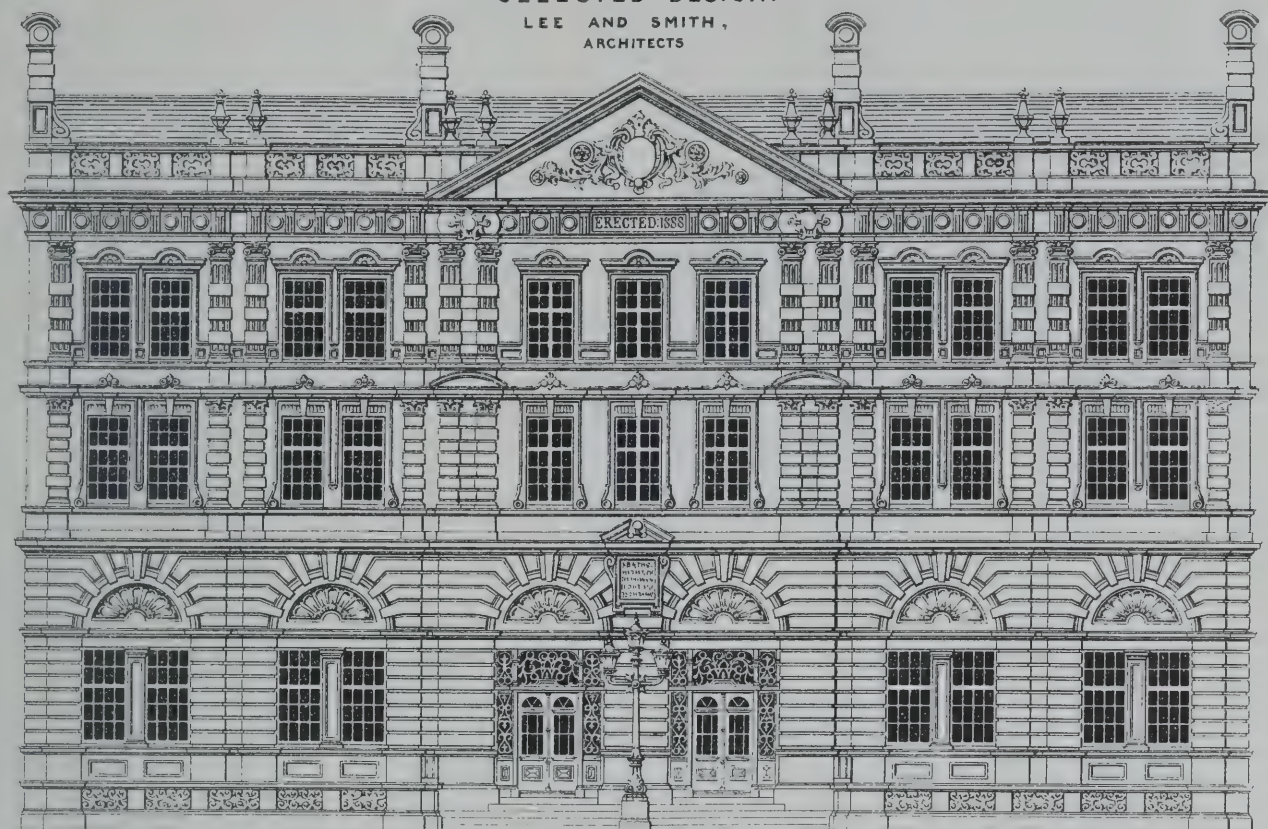


# PARISH OF ST. GEORGES. HANOVER SQUARE.

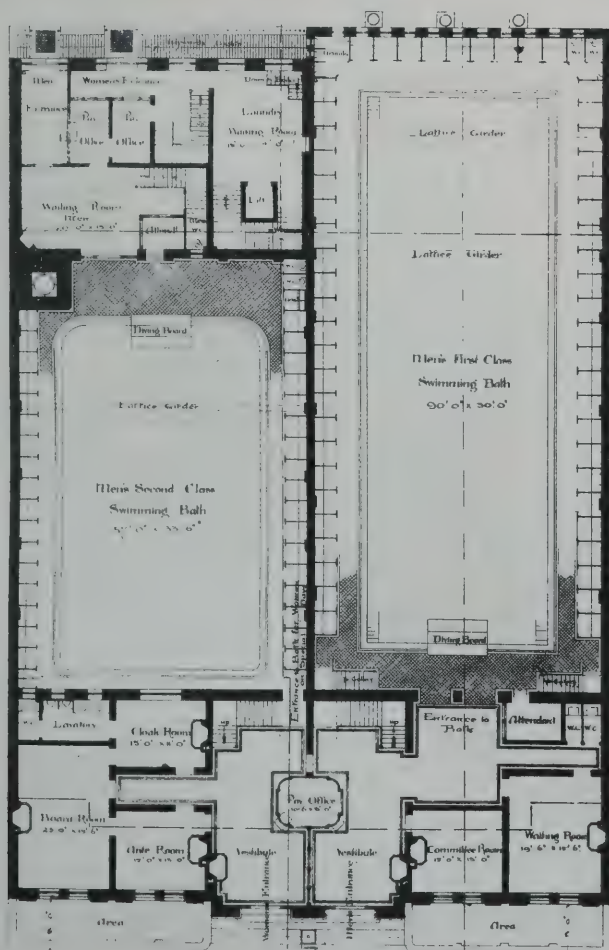
PUBLIC BATHS AND WASH-HOUSES.

SELECTED DESIGN.

LEE AND SMITH,  
ARCHITECTS



Front Elevation



Plan of Ground Floor



Plan of First Floor









STOKESAY CASTLE - SALOP. - 1290. -



STOKESAY CASTLE SHROPSHIRE drawn by T. Locke Worthington, A.R.B.A.

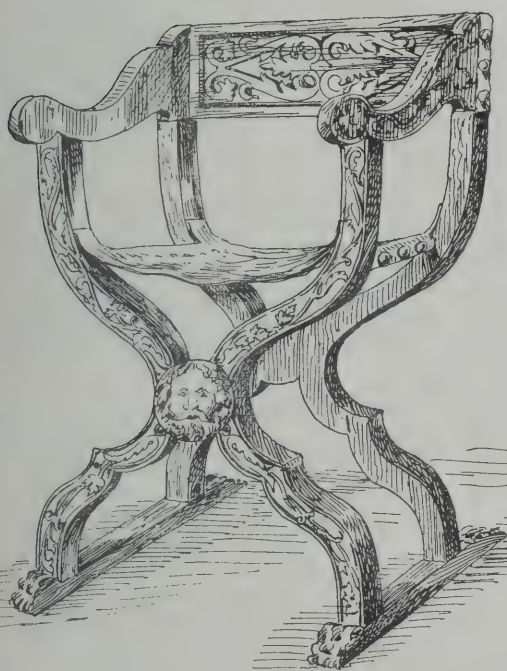








OAK · SETTLE



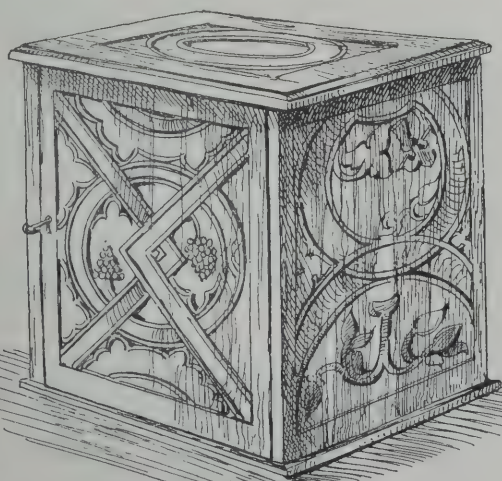
CARVED · CHAIR



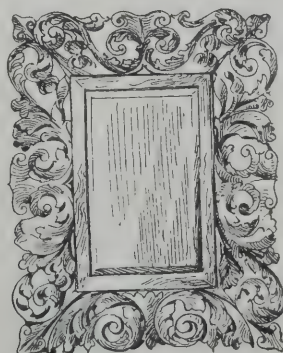
BELLOWS



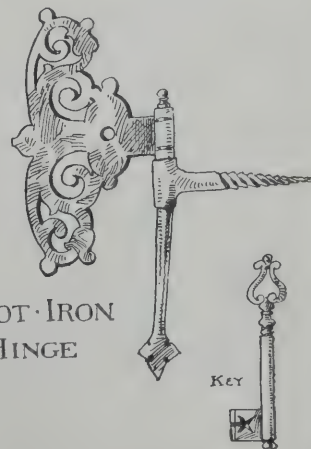
ANGLE · CABINET



OAK · CABINET



CARVED · FRAME



WROT · IRON  
· HINGE

Key

HOME · ARTS · ASSOCIATION  
A · FEW · SKETCHES  
OF · THE · YEARS · WORK · LATELY · SHEWN  
AT · THE · ALBERT · HALL







## WAYSIDE NOTES.

WHAT do you consider to be the architectural topic of the hour?" I somewhat despairingly asked a friend a few days ago. "Water-frolics and rambles by the seaside," quoth he. Perhaps he was right. Even up to this date there is wonderfully little moving; to employ a technical term of unfortunate elderly assistants who call periodically upon one. I suppose most architects are it of town. Being prevented from taking a lengthy holiday myself, I notice the absence of movement in the magic architectural circle. I hope that all who have been away have had—and that all who are away are having—a good time; and I trust that some few will commiserate with the ancient Goth, whose chance of enjoying an autumnal Continental tour has, or some weeks past, been growing "smaller y degrees and beautifully less," till now it has apparently vanished altogether.

As regards topics of a class more in order than water-frolics and rambles by the seaside, there is certainly a lack of anything of great interest. One can only hope that the duller part of the season has been reached, and that henceforth there will be an increasing quantity of matter to be discussed. When the various earned architectural bodies reassemble the times will be more lively. Meanwhile, as touching the doings of these bodies, I will express a regret that the Society of Architects should have been compelled to put off until next year that which should have been accomplished in the present one; and will rejoice that the Architectural Association excursion has been made in triumph, and that a party of members are now ready to join in the visit to Hatfield House fixed for to-morrow, where they will see much that is exceedingly interesting and beautiful, besides some admirable electric lighting arrangements. I have the above facts on my list, upon which, also, I see "New Railways" noted down. I suppose in reference to a few unimportant branch lines just opened. There is not much to be said about them, except to regret, with the rising generation of C.E.'s, that so little railway work is wanted in this country; but it reminds me that, having had to pay a flying visit to Bournemouth a few days back, I have had an opportunity to inspect the permanent way of the new "direct route."

The line runs through some pretty country, and what one can see of the New Forest is very beautiful, even if it does not bear comparison with the wilder scenery of the more solitary depths of the great Conqueror's hunting-ground. Yet on Saturday last I had many an enchanting glimpse of close forest glades and of open chases, with a middle distance of thick foliage, backed by a sea of tree-tops extending into the blue distance, and with a foreground of common-like country, purple with luxuriant heather and bright with patches of autumnal grasses, of every tint of warm brown and orange. The line itself appears to be an excellent piece of engineering. It is prim enough now, certainly, with its brand new iron and bright red-brick bridges, although rank vegetation has pretty well covered the slopes of embankments, except where these features are scored with chalk drains, in parallel rows, which abut on dwarf retaining walls of concrete, with earthenware pipe-drains, or of local stone placed in position without any cementing material, so that the water may percolate through the joints. Travelling is smooth over the metals, even at a considerable pace; for, although the S.W.R. is hardly likely to beat the recently-established record of ninety miles in ninety minutes, its speed is gradually improving, the new express engines of Messrs. Robert Stephenson and Co.'s manufacture showing that the old firm maintain a high standard of workmanship.

The Hôtel Mont Dore will shortly be lighted throughout by electricity. The building is "wired," and the clips for the incandescent lamps are fixed in pretty pendants and chandeliers. Further improvements are being made at the Mont Dore; a winter garden and covered tennis-court are being constructed, in a pavilion style, above the flat roof of the elaborate baths.

I rather imagine that Bournemouth will go ahead now that the new line places it within easy reach of the metropolis. If only the South-Western Railway Company could be induced to still further accelerate the service to the town—and they could run to the fine new station at Bournemouth East in two and a half hours, or under—there would be a considerable increase in business, and the Bournemouth architects would be busy. I don't want Mr. B. to hear of this, as there appears to be a happy absence of reckless jerry-building in the beautiful town surrounded by a belt of murmuring pines.

In the matter of electric lighting, I see that the inhabitants of Barnet have had the good sense to adopt the light. The town is now illuminated by seventy-one lamps. "Where the wires cross main thoroughfares they are laid underground in creosoted wooden troughs, and are insulated with rubber and incased in lead tubes to protect them from mechanical injury." At the works of the company that is lighting the streets of Barnet additional plant are being put down for supplying from 1,000 to 5,000 lamps for use in private houses, churches, &c., there will be a lot of private buildings supplied with the electric light this winter.

I have a note of a discovery made at Margate. A paragraph in the dailies at the beginning of the week stated that a man was engaged in digging a hole in a field adjoining Trinity Church, when his pickaxe suddenly penetrated a cavity and fell from his hand, he himself having but just time to move before the earth gave way and disclosed a large subterranean chamber about 12ft. in height. A number of human and other remains were found, and a long underground passage "probably connecting the chamber with the seashore." The construction of the large chamber has not been described, and it may be merely an excavation in the chalk. It is hardly likely to be another mysterious place like the "Grotto" at Margate, which ninety-nine persons out of a hundred pass by as an ordinary, made-up modern show place, whereas it is nothing of the sort, but a most curious little arrangement of subterranean chambers, elaborately inlaid with shells and other marine objects, affixed to the hard chalk with a most tenacious cement. This grotto can only be a hundred yards or so from the newly-discovered cave. Curiously enough, both places were found in the same way—by men digging or picking at the earth, and suddenly finding their spade and pick disappear. Although I had a long time back been told by an architect that the grotto was well worth a visit, it was only last June that I took an opportunity to see it. As to its origin I cannot even hazard a guess.

Dover is to have a promenade pier. On August 30th a meeting was held at the town to consider the advisability of erecting the pier, and as the assembled townsfolk were strongly in favour of the proposal, it is to be concluded that steps will be at once taken to provide the structure. Dover evidently is not to be outdone in the matter of piers by Folkestone. The new pier at the latter place, which I had an opportunity to visit a few weeks back, has a rather heavy-looking pavilion on the broad platform at the end, after the nature of the one at Hastings. The proposed Dover pier will be similarly provided with a pavilion. Music halls, pure and simple, are what these pavilions become, and it is curious to note that vast numbers of persons who would scout the idea of entering a music-hall on land, make no scruple when the building is supported on a few iron piles and juttied out into the sea.

That the result of the Clapham Public Library competition should have given rise to much angry discussion, does not surprise me much. For the committee to adopt a scheme that will cost more than was originally contemplated, and to calmly endeavour to pension off the competitor whose plans, I understand, most nearly solved the problem, is a circumstance calculated to arouse the ire of others besides those directly concerned in the result of the competition. Even if, as "Abuker" said in the *Echo*, many false charges are brought against the committee, the fact remains that they have overridden the most important condition—namely, that of

cost. Had the amount offered to Mr. J. J. Jones been sufficient to remunerate him for the plans little would have been said. A ten-pound note is to be looked after in these times, but under the circumstances it was a beggarly sum. If I rightly understand the facts of the case, the whole affair is disgraceful. Although I lately spoke of the difficulty of providing a fixed sum in competitions, the system of limiting the expenditure must be rigidly adhered to, if even a small percentage of competitions are to be brought to a satisfactory termination. Expenditure, we know, has little or nothing to do with true architectural effect; but it has all to the world to do with the provision of bare accommodation—and, therefore, with a few additional hundreds of pounds it is an easy matter to outstrip one's fellow competitors.

It is just as I half-guessed last week. Mr. Albert Hartshorne's impassioned appeal to the *Athenæum* against the "shocking treatment" of the oak panelling in the Long Gallery at Haddon Hall, and his prayers to the Duke of Rutland "to order the instant arrest of the vandal hand" which was working such "dire mischief," is a case of the boy and the wolf. The "Vandal" turns out to be Mr. F. J. Furnival, who roundly characterises Mr. Albert Hartshorne's letter as an astounding specimen of ignorance. The panelling, Mr. Furnival explains, is of oak, but is now covered by faded brown paint put on a hundred years ago and intended to represent a cross between chestnut and walnut. This paint, by the Duke of Rutland's authority, he oiled on a few panels and then scraped it off, revealing the fine, rich brown oak underneath. The Duke has promised that the oak shall be cleaned from this coating and restored, and, no doubt, will bestow on Mr. Hartshorne the "tender graces" of the scraped-off paint which the would-be critic so much admires. Mr. Furnival calls on Mr. Hartshorne to offer an apology for his glaring attempt to justify a shameful outrage on taste and on antiquity, and concludes, "How true it is that you can never begin to remove an abuse without being denounced by the ignorant and the prejudiced sentimental lovers of quasi-modern shams!" I wonder what the apology will be like—Hartshorne and sweet oil? Let's hope the unguent, and not the irritant, will prevail this time. GOTH.

## CHIPS.

A new reredos is about to be placed in Cross-thwaite Church as a memorial to the late Miss Rorke, and at the same time the floor of the church will be raised two steps in height and paved with mosaic marble. Mr. C. J. Ferguson, of Carlisle, is the architect, and the outlay will be about £600.

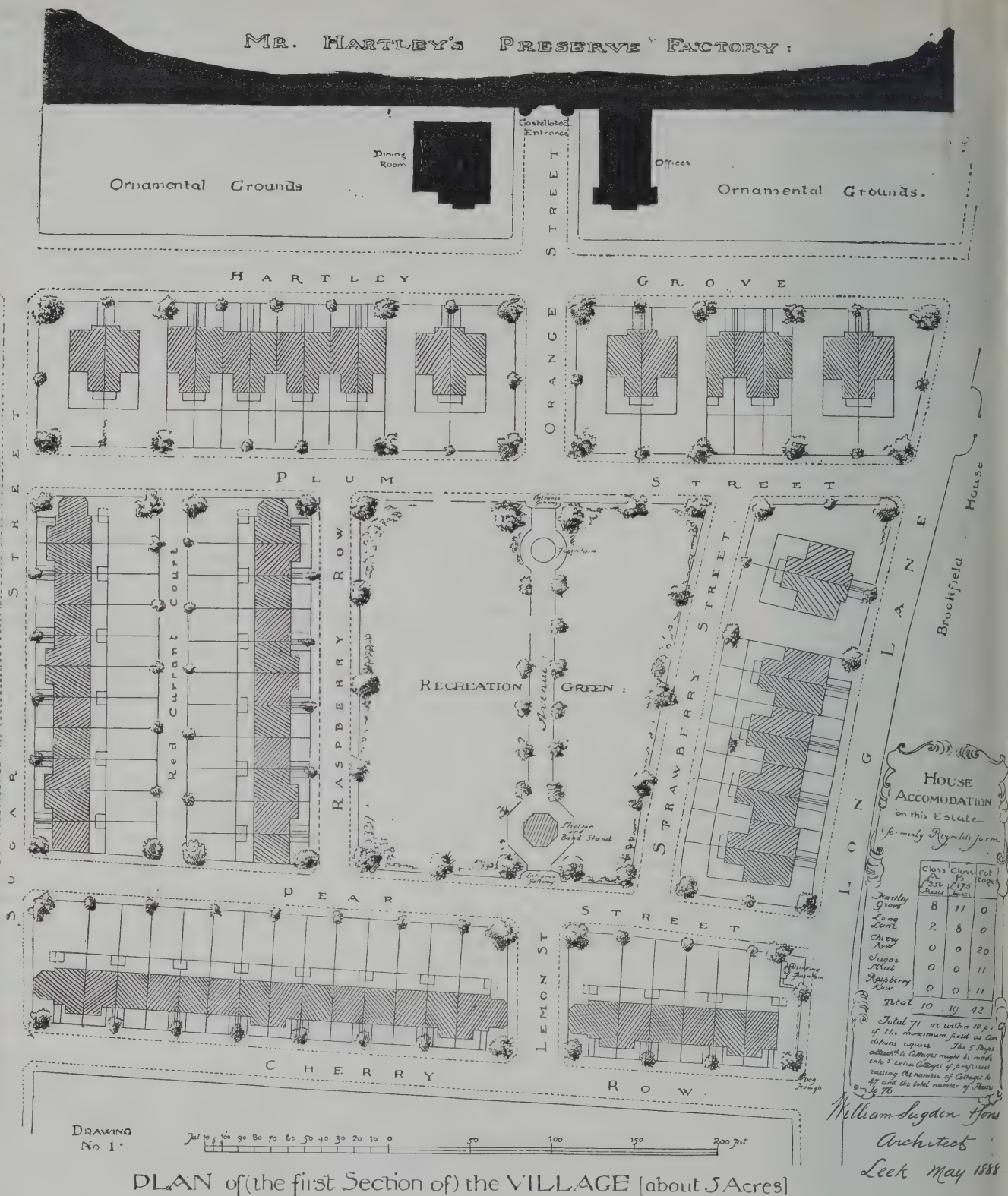
Various works of restoration have just been carried out at the parish church, West Bromwich, from plans by Messrs. Wood and Kendrick, of that town. The builder was Mr. William Bennett, of Lozells, Birmingham.

The new branch line which has for some time past been in course of construction to Greenwich by the London, Chatham, and Dover Company was to have been opened on Monday, but it is postponed for a fortnight. It commences at the company's Blackheath-hill Station, and terminates at Stockwell-street, Greenwich, and within about two hundred yards of Greenwich Park. The line, which is little more than half a mile in length, is constructed throughout in a cutting from 20ft. to 25ft. deep, the retaining walls being faced with concrete the entire length. The line passes under eight streets. The works have been carried out under the supervision of Mr. R. Barker, the company's resident engineer, Messrs. Lucas and Aird being the contractors.

Colonel W. M. Ducat, R.E., an inspector of the Local Government Board, held at inquiry at the Town-hall, Tunstall, on Friday, into an application by the local board of health for sanction to borrow the sum of £5,000, for the erection of baths and wash-houses, a fire-engine station, stables, and town yard. Mr. A. R. Wood, surveyor to the board, exhibited and explained the plans.

Mr. Joshua W. Butterworth, F.S.A., vice-president of the London and Middlesex Archaeological Society, proposes to commemorate the visit of the society to Edmonton Church on July 26th last by the erection of a monument in the church to the memory of Charles Lamb and William Cowper, the poets. Mr. James Forsyth, sculptor, of Finchley-road, has been commissioned to execute the work, from a design of Mr. Thomas Milbourn, architect, hon. sec. of the society.





### MODEL VILLAGE AT AINTREE, NEAR LIVERPOOL: SELECTED DESIGN.

[WITH PHOTOLITHOGRAPHIC ILLUSTRATIONS]

WE print to-day plans and elevations of the houses to be built by Mr. Hartley for his workpeople on a site known as "Reynolds's Farm," adjoining his factories, in accordance with designs obtained in a competition recently held. Messrs. Wm. Sugden and Sons, of Leek, are the authors of the premiated plans, and those by Mr. Frank W. Mee were placed second. The block plan accompanying the detail drawings herewith published furnishes particulars of the house accommodation, showing also how the recreation-ground is laid out and the streets arranged.

The County Mayo lunatic asylum at Castlebar is about to be enlarged at a cost of £5,000, from plans prepared by Mr. Glover, C.E.

### MASONRY AND STONE-CUTTING.

By LAWRENCE HARVEY.

FIFTEENTH LESSON.

WHEN a groin is formed by the intersection of two vaults crossing one another, the vault cannot stand before it is completely built; but when the vaults form a coved ceiling, as in Fig. 86, the structure can be stopped at any level on condition that the last course of stones be constructed in form of a straight arch, as shown in our drawing, to prevent the several stones of the course slipping down inside. This precaution is not required for the courses below, as the pressure of the courses above prevents the stones slipping.

Any number of vaults may, as in Fig. 87, meet round an irregular polygon, and if they are all of elliptical section springing from the same level, and rising to the same height at the crown, the plans of the groins formed by their

intersections will be straight lines. In Fig. 87 four vaults meet around the polygon ABCD the smaller vault is semicircular, the others are elliptical. In a central position we select a point O, which in this case we have taken at the intersection of the lines VY and XZ which connect the centres of the opposite sides of the quadrilateral. Now, suppose four ellipses, all having their minor axes equal to OX, and their major axes on AB, BC, CD, DA respectively; the four vaults of which the above ellipses are the guiding lines, and of which the generators are parallel to the lines XZ and VY, will intersect one another along groins straight on plan, such as OA, OB, OC, OD. As the centre line OX of the cylindrical vault from O to X is not in the direction of the centre line XO' of the semicircular arch, there will be a groin formed above the line AB similar to the groin at the return angle of a cloister; that is, it will form



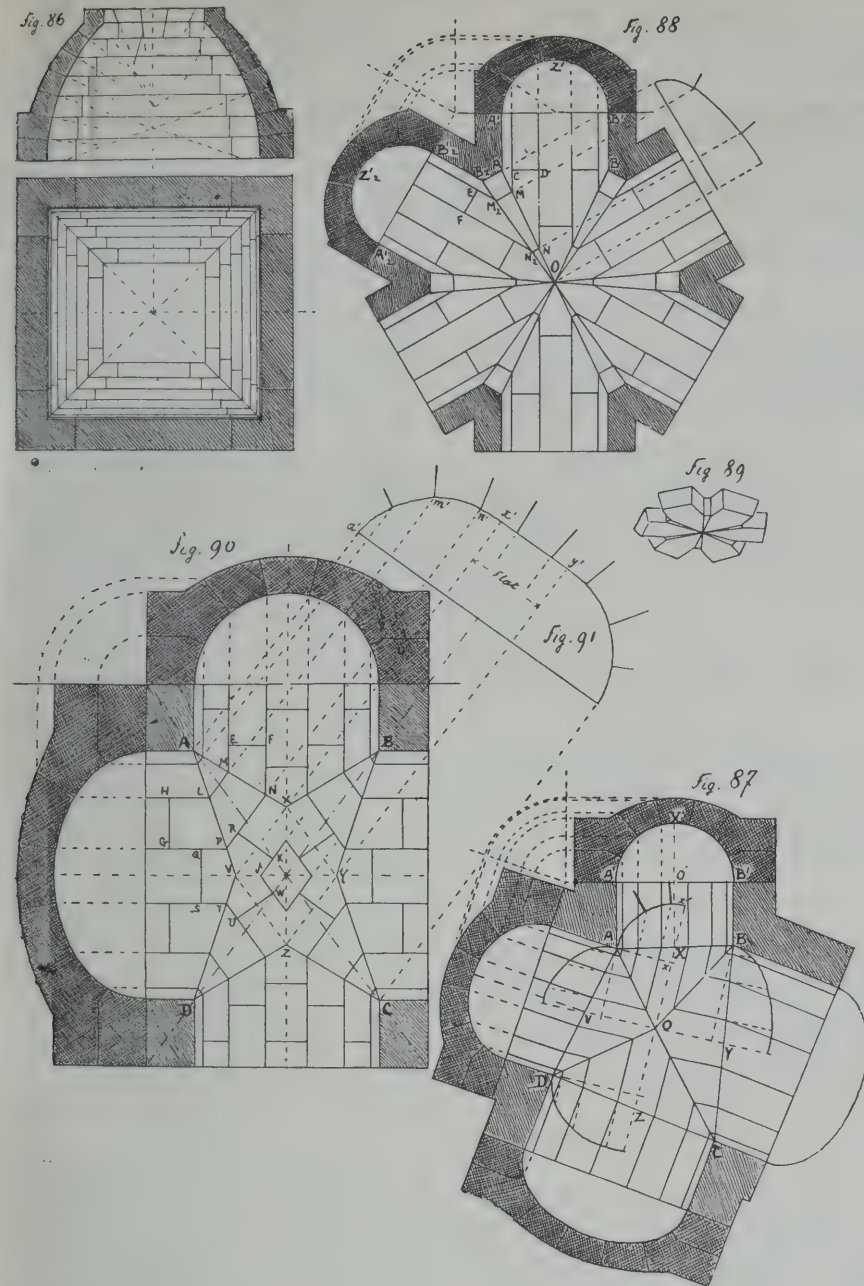
## Building Intelligence.

**COLESHILL.**—The spire of the church of SS. Peter and Paul, Coleshill, like those of several of the contemporary churches of Warwickshire, has during the last few years shown evidences of decay. It was, therefore, truncated to within a few feet of the supporting tower, and the work of rebuilding has been undertaken. The nave and chancel were restored in an admirable spirit in 1859, the total cost of the work, amounting to £12,000, being defrayed by the Digby family, who are the proprietors of the chancel; a clock, Communion plate, and an organ being at the same time provided by the parishioners, at a cost of £530. The foundation of the church dates from pre-Norman, but the edifice is chiefly of the Decorated and Perpendicular styles. The church contains monuments of the De Clintons and of several members of the Digby family. The crocketed spire, though lowered 15ft. in consequence of injury sustained by lightning in 1550, was visible for many miles round. It was restored some years ago; but the sandstone used was of a soft and crumbling nature, and the present rebuilding is absolutely necessary for the safety of the rest of the church. The cost of the work is estimated at £1,700.

**DARLINGTON.**—The new church of St. Hilda, Darlington, was opened on the 30th ult. It has been designed by Mr. J. L. Pearson, R.A., and is Early English in style. The walls are of red brick, with stone dressings. Stone is also used for the pillars, capitals, and the voussoirs of the arches dividing the chancel from the morning chapel on the north and the organ-chamber on the south. The shafts of the piers supporting the pillars are alternately octagonal and circular, and the bases and capitals are moulded. The roof is an open one of pitch-pine, with tie-beams. The west window consists of three lofty lancets, divided by wide piers of red brick; but the east window, of cathedral glass, has facings and piers of stone. The altar is of oak, and the pulpit of Leeds stone. The floor of the church is of wooden blocks and Staffordshire tiles, and cathedral chairs will, for the present, afford accommodation for 560 worshippers.

**GATESHEAD.**—New schools at the Teams, built for the Gateshead School Board, were opened last week. The building consists of three blocks. On the ground floor of the entrance block are the masters' and teachers' rooms, hat and cloak-room, and lavatories for the boys. On the next floor the same arrangements are provided for the girls. On the floor above the whole area forms a room for cooking lessons, &c. The block immediately behind, connected by corridors, is a school and classroom for boys and girls. The third block comprises the infants' department, and is one story high. The walls are built of brick with stone stringing. The work has been carried out by Messrs. Haswell and Waugh, Gateshead. Mr. W. H. Dunn, of the firm of Thompson and Dunn, Newcastle, was the architect, Mr. Wm. Edlington acting as clerk of works.

**NOTTINGHAM.**—The new block of municipal buildings, to be called the Guildhall, erected on the site of the old cattle-market, abutting on to Burton, Sherwood, and Shakespeare-streets, and in the immediate vicinity of University College, has just been completed. The old town hall, a small, unsightly structure in Weekday-cross, had long been found inadequate, and six years ago premiums of £300, £200, and £100 were offered for the three best designs for new buildings. As many as 117 designs were sent in, and Mr. A. Waterhouse, R.A., the assessor, recommended that the first and second prizes should be divided between Messrs. Verity and Hunt, of Regent-street, London, and Mr. F. H. Oldham, of Manchester, their designs being considered of equal merit, and at the same time he suggested that the plans of Messrs. Verity and Hunt should be accepted, as being best adapted for the purposes required. After Messrs. Verity and Hunt had altered their plans in accordance with the modified requirements of the corporation, the tender of Mr. Edmund Gabbutt, of Liverpool, was accepted for the erection of the building, the amount of his contract being £61,700. The



a projecting arris from A to X, and a valley from X to B. The same applies to the groin lines on BC, CD, DA, formed by the other vaults. The joints of the several vaults comprised in this structure must be normal to the soffit of the vaults. We shall begin by drawing the jointing on the semicircular section A'X'B' of the smaller vault, and the joint lines are then carried all round the other vaults at the same level. Then we draw the right section of the cylinder of centre line OX; this is an ellipse of which the axes are Ax and xx' = O'X'. On this section we mark the divisions of the joints, and draw the joints normal to the ellipse; the planes of the bed-joints are completely determined by the joints on section and by the joints on plan. The intersections of the beds and the bed moulds will then be found by the same methods we have used for the return angle of a cloister.

In Fig. 88 we have groins formed by the meeting of six barrel vaults, in which a splay has been provided to cut off the sharp angles which otherwise would exist between each vault. The splay AB<sub>2</sub> is made to be the side of a cylindrical vault of elliptical section, which rises from AB<sub>2</sub> to its crown in O; the intersection of this vault by the two neighbouring barrel vaults A'Z<sub>2</sub>B<sub>2</sub> and A'Z'B' gives two groin lines which meet in O. Thus, every barrel vault is separated from its neighbour by double groin lines, which comprise a piece of cylindrical surface. Everything that has been said about the jointing in other cases of

groining applies to this; but it must be noticed that one stone must comprise the figure CDNN<sub>2</sub>FEM<sub>2</sub>MC, so that this stone has three cylindrical soffits. The working of the stone is done by any of the methods used before in the return angle of cloister. The keystone (Fig. 89) is cut as that of any ordinary groined vault, beginning by producing an hexagonal prism, on the faces of which the head moulds are placed.

In Fig. 90 we have double groins which diverge from the point of springing so as to form on plan the figure of a star. To produce this, a parallelogram VXYZ is first drawn with sides parallel to the diagonals AC, BD. Then the groins are made to meet two by two at the points VXYZ. The triangular spaces between the groins are filled by cylindrical vaults of elliptical section, starting from the angles of the walls, such as A, and rising to the same level as the barrel vaults at their crown VX. The parallelogram VXYZ is formed of a flat arch, or, if small enough, by one stone, which may be decorated as a pendant keystone. The diagonal section of the vault is shown on Fig. 91, by which it will be seen that the voussoirs around the keystone have soffits partly flat, partly cylindrical. The outline KRPQSTUWSK comprises the soffit of one stone, and EFNPGHLM that of another. The jointing is done in the same way as for the other groin vaults, and so is the working of the stones, which we need not, therefore, describe again.



Guildhall is of stone, the style being the French Renaissance. The mayor will open the buildings on the 20th inst.

### CHIPS.

The Church of St. Mary de Wyche, at the junction of Over-street and Wychbold and Stoke Works-roads, Droitwich, was opened on Friday by the Bishop of Worcester. The church is in the Late Decorated style, and is built of Malvern Hill stone, with Broomsgrove stone dressings, and lined internally with red brick. Sittings are provided for 348 persons. The east window is filled with stained glass, in memory of the late Sir R. P. Amplett. The tower, which is in course of erection, is the gift of Mr. J. Corbett, M.P. It will be 60ft. high, and will hold a peal of six bells. The church has been erected from the designs of Mr. L. Sheppard, of Worcester.

A new mission-room at Halton, near Whitkirk, which has been erected at a cost of £200, was dedicated on Friday by the Bishop of Penrith. The building, which is of red brick, is of a substantial character, and has accommodation for 150 persons. The work has been carried out by Messrs. Tomlinson, builders, Leeds.

The town council of Middlesbrough have decided to ask the Prince of Wales to open, in December next, the new municipal buildings now in course of erection from plans by Mr. G. G. Hoskins, of Darlington.

Good progress is being made with the erection of the new public markets for Carlisle, from designs by Messrs. Causton and Graham, of London, which were selected in competition two years since. The style is Composite. The external work is of red sandstone, from a quarry at Aspatria reopened for the purpose, the dressings being of Haydon stone. Messrs. H. and R. H. Hodgson, of Workington, are the contractors for masonry and builder's work, and the contract for the roof, for which Mr. Walmisley is the engineer, has recently been let to Messrs. Conway, Sheldon, and Co., the fireproof flooring being undertaken by Messrs. Lindsay, of London. Mr. R. Nelson is executing the carving.

Fourteen bronze medals have been awarded by the Council of the Society of Arts, on the recommendation of the judges, to exhibitors at the recent Exhibition of Home Industries, held at the Crystal Palace by the Co-operative Union. The names include: in metal-work art, J. R. Stebbings, for specimens of chasing and embossing; in cabinet-making, Charles Cartwright, for brown oak sideboard; in house decorating, James Edwards, for six decorated panels; and in carving, L. J. Perrin, for specimens of wood-carving.

A brass lectern has just been placed in Carmarthen parish church representing a full-size angel bearing on its uplifted arms the Gospel to the four quarters of the earth, which latter is symbolised by the domical base, with its four pinnacles and foliage-embellished buttresses, separated by elaborately sectioned panels of tracery work. The book-rest is richly engraved and pierced. The style of the lectern is of the Perpendicular Gothic period. The work has been carried out by the well-known firm of Jones and Willis, of London and Birmingham.

Mr. Robert Dymond, J.P., F.S.A., died on Friday at his country residence, Blackslade, Widecombe-in-the-Moor. The deceased, with his brother, carried on an extensive business as land agents and surveyors. He was a well-known writer on antiquarian subjects, and secretary of the committee appointed by the Devonshire Association to report on works of art in Devon. He was also a regular contributor of papers to the Devonshire Association for the Advancement of Science and Art. Among his publications may be mentioned "Heraldic Discoveries in Exeter Cathedral." The deceased was 64 years of age.

On Friday, Colonel Rich, as inspector of the Board of Trade, made an inspection of the new double line of rails from the colliery bridge signal cabin, at Rhosddu, into the central station at Wrexham. He was accompanied on his inspection by Mr. Robert Piercy, C.E., Mr. William Davies, C.E., Mr. J. Wooley, contractor for the line, and Mr. Dutton (McKenzie and Holland, signal engineers). The line, which is a section of the Wrexham and Connah's Quay undertaking, has since been opened.

Mr. Justice Denman has dismissed the appeal brought by Mr. Robertson against the refusal by the master of his application for judgment under order 14 against the Metropolitan Board of Works for £86, arrears of the salary alleged to be due from the Board to him, mainly on the ground that there was a question to be tried between the parties, the defendants having alleged that the plaintiff had received certain moneys in fraud of the Board (which was denied).

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

### TERMS OF SUBSCRIPTION.

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### ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 6s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 6s.

### SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII., XLVI., XLIX., L., LI., LII., LIII., and LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—N. H. L. Bd.—M. Bros. and Co.—P. G.—C. and Co.—W. and R. L.—G. W. T.—W. R. N.—H. L.—F. W. H.

J. R. T. (Yes; Jeffrey and Co. or Woollams and Co. See advertisements for addresses. Don't waste money on the other barbarous abortions you mention.)—MEN-THOL. (Ewart and Sons is by far the best—the other affair is very unsatisfactory.)—PLUMBER. (No, we cannot. There is yet to be a perfect water waste preventer invented.)—BRICKS. (Not worth twopence—avoid all such "receipts.")—LEARNER. (A capital course—don't waste your time at Conduit-street.)

## Correspondence.

### STRAINS.

To the Editor of the BUILDING NEWS.

SIR,—The first diagram in the letter from Col. Seddon which you published on Aug. 31st, if it does not prove my case, at least shows upon what faulty premises he bases his own argument. Completely changing the conditions of the problem, for a homogeneous beam he substitutes one built up in segments with elastic joints. The joints naturally adjust themselves to the direction of the tensional strains upon them, for the beam falls into the same curve as would be assumed by a string supporting equal weights at equal horizontal distances.

The second diagram goes to prove my case. At each abutment, according to Col. Seddon's reasoning, there would be no shear. He cannot contend, however, that there is no reaction, for although the upward and downward forces are equal, they are not placed so as to neutralise. The reaction of the supports have therefore to be met by a load causing a cross strain in the beam. Unless such a cross strain (commonly known as shear) does exist, there cannot be equilibrium; therefore, there is a shear in the beam at each abutment equal to its reaction.—I am, &c., G. A. T. MIDDLETON.

### ARCHITECTURAL PLAGIARISM.

SIR,—Mr. Hall—if you may judge from his letter in your issue of the 17th inst.—seems to have made a discovery, and to be very much pained at it. He calls it by the above heading.

Now I would ask Mr. Hall what better a man can do than—given that he has no "ideas of individuality" of his own—to copy from such a man as Mr. Waterhouse, or even Mr. Hall himself, provided that he wants a faithful copy? Are we not all copying and embodying the ideas of others, and has it not been so from the beginning? Who can say that he is original? We only succeed in being good plagiarists when our souls are enlisted in the work, and then only after years of study and thought.—I am, &c., EDWARD CALVERT.

10, North-street, Andrew-street, Edinburgh, Sept. 3.

### GROUND FLOORS.

SIR,—For ground floors where you have sleeper walls, plates, and joists in the usual manner the average cost is about £5 per square. If, instead of this, you fill up the space under floor with chalk, lime core, or any similar rubbish, well rammed, to within 6in. of the finished floor level, and on that lay 3in. of Portland cement concrete, and on that 2in. of coke-breeze concrete, you can nail the floor-boards down to the coke-breeze concrete, and the cost will be about £3 10s. per square, or a saving of 30s. per square.

The coke-breeze concrete is formed with four parts of coke-breeze to one of Portland cement, and should be thoroughly mixed in a dry state and then water gradually added till the mixture is quite sloppy; this is necessary, because the coke-breeze absorbs a great quantity of water. Before the coke-breeze concrete is laid strips of wood 4in. by 2in. should be placed at intervals of 6ft. or 8ft. to form screeds so as to get a level surface. The coke-breeze concrete requires leaving for at least three weeks before the floor-boards are laid; but there are few cases where this is not possible, as the concrete can be laid as soon as the walls are up to floor level.

In all cases (three) where I have used this kind of flooring the results have been perfectly satisfactory, and, I need hardly say, very much better on the score of health and comfort.—I am, &c., CHARLES F. MOXON.

A new central telephone exchange office has been fitted up and opened at Manchester, in the Royal Exchange buildings. It contains in the switch room, which is 120ft. by 24ft. 1,800 wires connected by nine tables with a multiple switch board, and is regarded as the most completely-fitted building of the kind yet created. The structural alterations to the premises have been carried out by Messrs. R. Neill and Sons, of Manchester, from plans by Messrs. Mills and Murgatroyd, of that city, the architects to the Royal Exchange.

Mrs. Turner, of Bradford, has contributed the sum of £3,000 towards the recently consecrated Church of St. Hilda, West Cliff, Whitby, as a special memorial to her late son, the Rev. John Turner, for over three years curate of Whitby. The memorial will take the form of the building of transepts, vestries and choir stalls, sedilia, and other fittings in the chancel of the church. The work will be carried out from the original plans for the completed church prepared by Mr. R. J. Johnson, of Newcastle, the architect of the church.

The directors of the Buxton Gardens Company approved, on Friday, the plans of Mr. W. R. Bryden, architect, Buxton, for the erection of a building connected with the existing Pavilion in which theatrical and variety entertainments may be given. The estimate is £3,000, and the building, which will be simple Gothic in design, is to hold 710 persons. Building operations will be commenced in October.

The newly-appointed lecturer on architectural construction at Liverpool University is Mr. J. Battye, A.R.I.B.A., of that city, who will begin his lectures on Tuesday, October 9, and deal with subjects of interest to architects and those engaged in building. Each evening a preliminary lecture is delivered, and is followed by class work in the preparation of detailed drawings.

Mr. Michael Francis McElvoy, formerly of the Science and Art Department, South Kensington Museum, London, and late of the Royal College of Science, Dublin, Ireland, died on the 27th ult at his residence in Dublin.



## Intercommunication.

### QUESTIONS.

[9740].—**Headstones and Monuments.**—Can some reader inform me of a really good modern work (illustrated) on Headstones, &c.?—CONSTANT READER.

[9741].—**Drainage of Country House.**—I want to arrange the drainage of a country house. I thought of letting the sink discharge in the open over a "horsepot." If I lead the pipe from this and that from the bath and w.c.'s into one trap, with an inspection cover, ought they to enter the trap on the same level? Does the ventilating pipe communicate with this trap, and should it be connected with the soil-pipe at both w.c.'s? The sewage goes to a covered tank about 60ft. from the house. Will this length of drain want any ventilation? Should be glad of advice.—STACK-PIPE.

[9742].—**Baths.**—Will any of your readers inform me if there is any better system than copper cylinder and high-pressure boiler for getting hot water to bath-room and lavatory and scullery sink of a moderate house? Also if there are any good books upon this subject to be purchased?—DARLUS.

[9743].—**Fixing Marble Wall Lining.**—What is the best method of lining brick walls with  $\frac{1}{2}$  in. marble, and in what sizes should the slabs be used? Some advise me to bed it solid on a rendering of cement, and others to block it off the walls, leaving an air space behind to prevent discolouration, each slab being cramped and doweled with brass cramps and dowels. Will some reader experienced in the work kindly give a short specification and much oblige?—SEPIA.

[9744].—**Surveyors' Institute Exam.**—Will anyone kindly tell me what course of study is the best to pursue for the above, and whether classes are held for same?—H. J. G.

[9745].—**Variouse Veins.**—Is there any remedy for the continued standing that one has to do whilst drawing, more particularly details?—DRAUGHTSMAN.

### REPLIES.

[9700].—**Quality of Woodwork.**—"Durability." In his reply (Aug. 24) says he only partially agree with me in my reply (Aug. 17) to the original question (Aug. 3). He follows with a string of observations, some of which are wholly outside the question—as, for instance, wood suitable for joinery, the quality of modern flooring, &c., the original question being confined to timber as used for constructional purposes. Other of his remarks, although they are the result of over fifty years' experience, are open to question. I cannot enlarge upon my reply (Aug. 17), as he does not state which part of it is in question; but he affords me ample opportunity of reverting to the subject. "D." says: "I find the quality of timber and deals now used in building much inferior to that formerly employed, the reason being simply its cheapness to the builder without a corresponding benefit to the employer." This is a popular assertion, which should, in my opinion, be made with some reservation. We must rule out the time when English oak was the material of construction, and come to the general introduction of soft or fir wood, which hardly carries us back beyond a century. This pictures a time when only the best qualities of sawn goods were imported from the North of Europe for joinery purposes, and the hewn timber from Memel, &c., came to hand for carpentry with a great volume of small square timber, which was supplemented with timber from Scotland. This was largely used for joists, roofing, &c., as may be proved by examining any old building of an ordinary kind of that date. This small timber still reaches us from the Baltic, and is largely used as prop wood in our colonies. The better class, known in the trade as *Mauerlaten*, is used in scaffolding in London and other towns. All this wood to-day is looked upon as too common and sappy to be used as building timber. At a somewhat later date colonial spruce was introduced from Canada, and it rose to be the great staple in the building trade, as it is to-day along the West Coast of England and in Ireland. This spruce is used to some extent in London; but in comparison with the Baltic shipments of to-day it occupies a very subordinate position. If we take Baltic timber only, I agree that the remark bears some show of truth; but it may be thus explained. The removal of the duties upon other than colonial timber admitted the lower qualities of wood goods from the Baltic being brought into competition with the Canadian spruce, with this result: that the qualities of building timber, taken as a whole, improved, but that the qualities of Baltic fir wood, taken by itself, deteriorated. "D." says, "The best timber for carpentry is Memel, of which there are several qualities—crown, first, second, and third." This means that the wood is sorted into four qualities. There is no such sorting in the timber trade. The qualities are best, or first middling, second middling, and common middling, or Bauholz. He further says, "and for joinery Petersburg deals of several qualities selected according to the proportion of sap and knots." It is a fact that Petersburg and all other deals are sorted irrespective of sap. As to St. Petersburg being the best, what becomes of the claims of Archangel and other White Sea shipments? The prices of which now rule as follows per Petersburg standard:—

	Archangel.	Petersburg.
3 + 11 and 3 + 9 (best) .....	£16 15 0	£13 17 6
3 + 11 and 3 + 9 (2nd) .....	£12 5 0	£10 17 6

As the special merits of these woods are for joinery or high-class bench-work, I think the answer is obvious. If not, the practical users of wood have something to learn from "D." Take the next assertion, "for internal woodwork Gefle deals are very satisfactory." I am not of this opinion. It is a fact that, compared with St. Petersburg and the White Sea shipments, Gefle and all the Swedish stocks are hard and strong, and when worked up they cannot be relied upon to stand. The Swedish manufactured joinery is defective for this reason, and no English manufacturers of joinery will work upon Swedish wood, as practice inclines them to the softest and mildest shipments, such as we get from St. Petersburg and the White Sea. I admit that the best qualities of Gefle maintain a high price; but the quantity produced is not

above  $\frac{7}{8}$  per cent. to 10 per cent. of the stocks, and, compared with the best Russian stocks, is a very small factor in the trade. I admit that Gefle is a good timbering wood, and this is perhaps what "D." means by "internal woodwork." If so, how can we reconcile the next statement—"The general run of Swedish deals, if used . . . in framing of doors and such-like work, will not retain its shape, but twists to a serious extent"? I cannot admit that the shipments of Gefle, one part only in Sweden, are exempt from this evil, for such is not the case. Again—"The general run of Swedish deals . . . is very productive of dry rot, as witness the number of inquiries on this subject in your paper." This is a new and grave accusation against Swedish goods, and one in which there is no truth whatever. "Dry rot," so called, is the natural destructor or disintegrator of wood; it is a low form of vegetation feeding upon vegetable matter when heat and moisture are favourable thereto. Some species of wood are more prone to its attack than others—for instance, Quebec pine is far more liable than the Baltic fir. The Baltic fir itself differs in its power of resisting this insidious disease. Its power lies wholly in its degree of resinous impregnation; hence we find that all fir woods, Memel, for instance, growing on the southern fringe of the great forest belt of Northern Europe, is strongly impregnated with resin, the knots invariably red and sound, the wood hard and durable, and practically exempt from the ravages of dry rot. As we approach the northern range of these forests—instance the wood from the White Sea—resin is practically absent; the knots are dead and black, the wood soft and light, and defenceless against the attack of dry rot. It is always a rule, and always will be, that the softer the fir wood the weaker its bearing power, and the shorter its life or durability. If there is one thing more peculiar to the Swedish shipments of fir wood than another, it is its hardness, arising out of its resinous nature and its consequent durability. The geographical position of the Swedish forests is proof of this. The peculiarity of the shipments of the Baltic, if we except that of St. Petersburg, which is a mild, soft wood, owing to its being brought from more northern forests by means of the inland lakes, which find their outlets in the Neva, is that it is hard, strong, and resinous, and consequently durable—i.e., less free from the ravages of dry rot than softer and milder wood. The question of the "abominable foreign-sawn boards" I will not touch upon, although I could offer some interesting remarks thereon; but will pass on to—"The best deals in my early recollection were Archangel. I have seen them placed in the most trying situations, and after fifty years they are perfectly sound. This article is not in the market now, but a spurious substitute has been sold under that name." This evidently means that Archangel at one time was a valuable wood for timbering or constructional purposes, a statement I beg to challenge. It never was, nor never will be, a durable timbering quality of wood "when placed in the most trying situations." It is too soft and light to merit such a title. Archangel is inferior for timbering purposes to St. Petersburg wood, and immeasurably so to the best Finland and Swedish stocks. As to this old-fashioned article not being in the market now, it is all nonsense. The same thing is said of St. Petersburg, but there is no truth in it. Take the first quality of Archangel and Omega goods of high-class shippers, such as Brandt's and the Omega Wood Co.'s, or the first quality of St. Petersburg goods, such as Gromoff's, and nothing better need be desired, and, indeed, nature does not produce better, and it never did in my experience, which extends to nearly fifty years. I can furnish an interesting note respecting Archangel fir and its shortcomings on the point of durability. A few years ago a large cargo of 9ft. 10in. x 10in. sleeper blocks was imported into Grimsby with the idea of competing against the ordinary Memel and Riga sleepers. They were much admired on arrival for their cleanness and freedom from sap, but no sleeper-buyer would operate upon them. The surveyors of the great railway companies refused to pass them, and they were cast out of the trade. Their softness and absence of resinous matter, which condemned them for the purpose for which they were imported, suggested their use for joinery or bench-work. They were cut into deals, and disposed of to builders and manufacturers of joinery. Sundry parcels have appeared upon the market since this date, all of which have passed into consumption in the same manner.—Wm. STEVENSON, The Park, Scarborough.

[9724].—**Quantities.**—Mr. Lovegrove says, "It is the custom to describe all floor joists except ground joists as *unframed*." If so, is not the custom a bad, vicious, and untruthful one that should be discarded? Its breach would certainly be more honourable than its observance. The object of quantities is to get a true statement of the work, and not to class that as "*framed*" which is not framed any more than other is "*wrought*," which is rough from the saw.—X.

[9731].—**Claim for Damage from Settlement.**—Is it not possible, if not probable, that B's house is settling from the very same cause as A's, especially if both houses were built at the same time on a clay soil? I should be very careful about bringing an action.—H. L.

[9732].—**Contractors and Quantities.**—If quantities were sent to all the builders tendering by the architect's instructions, the builder might make what estimate he pleased, but he would still be liable for the surveyor's charges.—H. L.

[9732] and [9737].—**Payment for Quantities.**—The contractor is only liable for such a sum in payment for quantities as he is directed to include in his estimate. If he states, in giving in his tender, that he has included nothing for quantities, the sum allowed for them by the other contractors should be added to his tender before it is considered, and he will then be on the same footing as the others, and will be liable. 1. The proprietor of a building is liable for quantities as for drawings and specification, if he sanctioned their preparation. 2. As before stated, the builder is only liable to the extent included in his estimate. 3. The architect is liable to the surveyor, and the proprietor to the architect (see 1). All such difficulties are avoided by being paid for the quantities directly by the client, as was obligatory on members of the Institute until recently.—EBORTAL.

[9734].—**Contract and Conditions.**—The contract may be made by an elaborate agreement, a letter, or by a stamp on the form of tender; but the conditions are set forth separately, and form, together with the drawings and specification, the basis of the contract.—H. L.

[9735].—**Timber.**—The meaning of "thick baited" as applied to fir trees at page 169 in my recent work, "The Trees of Commerce," is that the annular rings or zones of wood are thick, and the longitudinal section of the wood is coarse in texture and appearance. This is a trade term that, so far as my experience is concerned, is of broad application. I have not been able to satisfy myself about the spelling, as I fail to find it in any modern dictionary. It appears in N. Bailey's Dictionary, published in the early part of the last century as follows:—Bate: the texture of wood. "N." does not give his reference to the use of the term "Southern Russian ports." I presume its use is applied to that great seat of the wood trade, the Baltic Sea, where the North Prussian and the South Russian ports embrace Memel, Dantzic, Libau, and Riga. The Black Sea ports are certainly more south than the southern ports of Russia in the Baltic; but "R." is not correct in stating that we do not get timber from there. For some years past we have been doing a large and increasing trade with Odessa and Sevastopol in oak timbers and wainscot logs and boards. It is practically the same oak as we get from Riga, the better brands of the latter being drawn from the neighbourhood of Kief. I have always understood that the correct term for the region south of St. Petersburg, the agricultural zone, is "Southern Russia," and that the region north of that city, the forest zone, is "Northern Russia"—with this qualification, that they are both in Europe.—W. STEVENSON, The Park, Scarborough.

[9737].—**Quantity Surveyor's Fees.**—1. The employer is liable to pay the charges of the surveyor for preparing quantities if the work is not carried out. 2. If the works are carried out the builder is liable, provided that it is clearly stated in the summary. 3. The architect would be liable if he himself employed the surveyor without reference to a principal.—H. L.

[9737].—**Quantity Surveyor's Fees.**—(1) Cannot be answered without further particulars. Who ordered the quantities—owner or architect? If the latter, was order given with sanction of owner? (2) Ordinarily yes, but somewhat depending upon circumstances. (3) In "Gordon v. Blackburne" in the Lord Mayor's or Sheriff's Court, London, it was decided that the plaintiff (quantity surveyor) could recover from Blackburne (architect), who gave the order without disclosing his client in a case in which the building was not carried out. This case was in January, 1879, and probably reported in BUILDING NEWS, February, same year. But it must be borne in mind that although the decision was the opinion of a trained lawyer who was the judge, the Court is not a Court of Record, and the judgment, though probably a sound one, is not a precedent to be quoted as law in a Court of Law. It arises out of the legal principle that if an agent does not disclose his principal at the time of making a contract, the other party to the contract may elect to hold responsible either the principal or the agent, or both jointly, but in the latter case may lose one set of costs. It must also be borne in mind that to make the principal liable it must be shown that the agent has not exceeded his authority.—A. H.

### CHIPS.

Some time since a large clock was erected at Adderbury church, Oxfordshire, by John Smith and Sons, Midland Clock Works, Derby, and now the same firm have fixed a large carillon, in connection with the clock, which plays seven tunes on eight bells (one tune for each day of the week), at three, six, nine, and twelve o'clock. The largest bell is 25wt.

The Preston town council considered, at their last meeting, a report by Mr. Reah, the borough surveyor, on the sewerage of the town, in which a fresh scheme was proposed in consequence of the present sewers being tide-locked twice a day and consequently converted for the time being into elongated cesspools. The estimated cost of the scheme is £130,000. A committee was authorised to call in an engineer to report on the scheme and to report back a month hence.

A proposal has been made to pull down the new Anglican cathedral in Melbourne, now approaching completion, and to erect it elsewhere. In consequence of the land boom, little difficulty, it is stated, would be experienced in disposing of the site for nearly £500,000.

The tottering edifice which for many years served the purposes of a Catholic church in Ashbourne, Derbyshire, has been replaced by a plain but handsome Gothic church dedicated on Sunday, August 26th, under the invocation of All Saints. The design was executed by Mr. Simpson, architect, of Manningham, Bradford, Yorkshire, and has been carried out by Messrs. R. and H. Gratton, builders, Ashbourne.

St. Saviour's mission chapel, Exmouth, was reopened on the 30th ult. after enlargement by the addition of a north aisle, raising the accommodation from 240 to 340 sittings. Mr. R. Medley Fulford, of Exeter, was the architect, and Mr. Hooper the builder.

Mr. Arnold Taylor, one of the Local Government Board inspectors, held an inquiry at the town hall, Selby, on Friday, as to the application of the Local Board of Health for powers to borrow £2,050 for the purposes of street improvements.

A congress of delegates of societies of antiquaries is proposed to be held at Burlington House under the auspices of the Royal Society of Antiquaries on some day during the ensuing autumn, the objects of the conference being—first, the better organisation of antiquarian research; and, second, the preservation of ancient monuments and records.



## LEGAL INTELLIGENCE.

**DAMAGE BY SEWAGE WORKS.—ARBITRATION.**—In this case, which was before Mr. W. J. Beadel, M.P., as umpire, at the Surveyors' Institution, a claim was made by Mr. Bradshaw, the owner of some land at Ponder's End, against the Cheshunt Local Board. It appeared that the Local Board carried an effluent sewer across the plaintiff's land from Duck's-foot Lane, which would prevent the use of part of the land, as the sewer could not be built over without permission. The plaintiff claimed £542 14s. 3d. His case was conducted by Mr. Terrell, barrister, who called Mr. Richard Cook, surveyor, Mr. Henry Lovegrove, F.S.I., and Mr. J. T. Newman. Mr. Firth, M.P., conducted the case for the defendants, and he called Mr. Edward Tewson, F.S.I., of the firm of Messrs. Debenham, Tewson, Farmer, and Bridgewater, and Mr. T. Bennett, the surveyor to the Local Board. The arbitrator has given his award: £54 12s. 6d. to be paid to the plaintiff.

**THE WEAVER TRUSTEES AND THE VYRNWY WATER SCHEME.**—Sir Douglas Galton has printed his award in the dispute between the River Weaver Navigation Trustees and the Corporation of Liverpool as to the method by which the pipes from Vyrnwy to Liverpool should be carried across the river Weaver. The trustees desired that a tunnel should be made at a considerable depth below the river, through which the pipes should be carried; but Mr. Deacon, water engineer to the Corporation, thought that a simpler and cheaper plan would be to dig a trench across the bed of the river and place the pipes in it. After hearing much evidence, the arbitrator has now given his decision in favour of that plan, modifying, however, Mr. Deacon's proposals by a stipulation that the pipes must be laid at a considerable depth below the bottom of the river, and be covered with a thick layer of concrete. The estimated difference in cost between the tunnel and trench was £10,000.

**WOODEN EXHIBITION ERECTIONS AND THE BUILDING ACT.**—At Hammersmith Police-court on Friday Mr. Paget heard several cases as to the wooden buildings erected in the grounds of the Irish Exhibition at Olympia without a licence from the Metropolitan Board of Works. Mr. St. John Wontner appeared on behalf of Mr. Knightley, the district surveyor, the defendants being represented by Mr. Campbell. The case against Mr. John Henry Rafferty, in regard to the arena or grand stand, was first taken. Mr. Wontner said that in May the erection of the arena and other buildings was commenced, and Mr. Knightley wrote to the various parties who had charge of them, giving notice that they had no right to erect them without a licence. Mr. Rafferty gave the architect instructions to apply for a licence. An informal application was made, but the buildings were erected, and had been in occupation ever since. The parties simply laughed at the Act. Mr. Knightley was called, and, in cross-examination, said that, in June, he was told that Mr. Birch (the architect) had made an application to the Board, but it was informal. Drawings of the buildings were sent in. The Board wished for further drawings, which were furnished during the vacation. Mr. Campbell showed that the buildings were surrounded by a high brick wall, and were 62ft. from buildings outside. Mr. Wontner explained that the arena was only 22ft. from a café, another large wooden building in the grounds. Mr. Campbell said that in the construction of the buildings every suggestion made by Mr. Knightley had been attended to. In the next case Henry Etherington was summoned in respect of the switchback railway. Mr. Birch was called, and said there was delay in getting the drawings of buildings in consequence of the number of contractors. There was a third case against George Baker, who had erected the Irish village. Mr. Paget, in dealing with the cases, imposed a penalty of 40s. upon Mr. Rafferty, and 10s. upon each of the others, remarking that substantially application had been made for the licence. He granted two guineas costs in the case of Mr. Rafferty, and one guinea in each of the other cases.

**HAWKSLEY V. THE LIVERPOOL CORPORATION.**—The result of a recent arbitration between the Council and Mr. Hawksley, by which that engineer has been awarded £14,000 and costs, came under discussion at the meeting of the Liverpool City Council on Wednesday. Mr. Bower, chairman of the Water Committee, explained the nature of the dispute with Mr. Hawksley, and urged that, notwithstanding the award of £14,000 to Mr. Hawksley, the payments previously made to him of £20,617, and the estimated cost of the arbitration, £4,000, the result really was a saving of £42,000, inasmuch as the Corporation were relieved of commissions further payable to Mr. Hawksley. In the course of a discussion, Mr. Hughes thought the Corporation had received a warning not to put into their agreements clauses relating to arbitrations, which appeared to involve more delay and greater expense than trials in ordinary courts.

## Our Office Table.

THE engineering laboratories at University College, Liverpool, are in course of construction from Mr. Waterhouse's designs, and are far from completion; but the professor of engineering intends to begin work therein during the month of October. One part of the new building is to be finished and railed off for use, so that the pupil-teachers in the elementary schools in Liverpool may be taught the elements of wood-carving and fretwork. The children in the elementary schools are to be taught gratuitously by a peripatetic system now being elaborated, by means of which the teacher and the materials will go from school to school at certain hours, and give lessons in woodwork. The idea is not to teach a trade, but to train the hand and eye of all the likely children, as a first step in the direction of technical education. It is expected to be one of the finest engineering schools in the kingdom.

A PAPER on "Scottish Masons' Marks" was read by Professor T. Hayter Lewis, F.S.A., at Glasgow on Friday evening, at the closing meeting of the British Archaeological Association. Professor Lewis remarked that of those curious marks Scotland possessed a greater number than perhaps could be shown in England. They were found out on nearly every Mediaeval building of importance, and on very many buildings of greater antiquity. Many, if not most, of these strange marks had a definite meaning. Generally it was found that the same forms which were used in early times were continued in the later, though they were more ornate. After describing the marks as found in different localities and countries, he said that putting together all the information they had, they found first that certain definite methods of marking the general surface of the stone characterised the masonry of the styles which they called Norman; and that they apparently had a Western origin; second, in the 13th century there was introduced with the Early Pointed style an entirely different method of finishing the surface of the stones, and the source of this method was apparently from the East; third, that masons' marks did not appear to have been continuously used in Europe until late in the 12th century; and, fourth, that some of the most prominent of the marks appeared to have been used continuously from very early times in Eastern countries. He was not enthusiastic enough to suppose that these marks which the workmen had left would ever be so outspoken as to tell definitely of the great mind that was their pioneer; but he believed that the search into their meaning—a search which commenced only some fifty years ago—might lead to the discovery of the place and the means by which its influence was so powerfully and quickly spread.

SIR J. C. Robinson points out a danger to water-colours which has been too generally unconsidered—namely, the traces of chlorine employed in bleaching the rags in the process of making the paper, and which it is impossible by any amount of after-washing to eliminate from the material. Sulphide of soda is, it is true, afterwards mixed with the pulp to neutralise the chlorine, but the care of workmen cannot be guaranteed or very well tested, and the sulphide of soda itself is not without effect on some colours. He suggests that paper-makers should—as one engaged in the industry has already done—turn their attention to the manufacture and supply of non-chemically treated papers. The time, skill, and labour bestowed on his work by the water colourist, are thrown away if the colours prove fugitive, and no artist would grudge a slight extra expenditure for the material on which he works if he could thereby insure its being free from exerting deleterious influences on his tints.

What is believed to be the tomb of Madoc ap Gryffyddmael, grandson of Owen Gwynedd, Prince of Wales, has been discovered in the ruins of Valle Crucis Abbey, Llangollen, of which he was the founder about the year 1200.

The bells of St. Wolfran's Church, Grantham, were re-opened on the 23rd ult., after being rehung on new framework and beams by Messrs. Taylor, of Loughborough. Mr. J. Hall, of Grantham, was the builder.

## CHIPS.

Mr. E. H. Shorland, of Manchester and London, has recently supplied his inlet ventilators to the Isle of Wight Infirmary, Ryde.

Messrs. C. Isler and Co. have just completed a 436ft. artesian bored tube well at Messrs. Hargreaves and Co.'s, brewery, Abridge. The chalk was reached 80ft. nearer the surface than anticipated by several gentlemen connected with the Geological Survey. The water stands at 37ft. from the surface, and the supply obtained is over 1,500 gallons per hour. These results are particularly gratifying, as at Epping, Longton, and other places where wells have been sunk on the old principle to over 1,000ft. deep, they have totally failed. The supply was reached in the first 100ft. in the chalk, and it was by employing a specially designed deep well pump, and working it at various depths, that the above results were obtained.

A two-light stained glass window has just been erected in the parish church of Hanging Heaton, near Dewsbury. The principal subject, which runs through both lights, represents "Mary at the feet of Christ." In addition to this, the left-hand light has two groups, "The Descent from the Cross," and "The Last Supper"; and the right-hand, "Mary at the Sepulchre," and "The Agony in the Garden." The work has been executed by Jones and Willis, of Birmingham and London.

We regret to record the death of Mr. Edgar John Varley, the Curator of the Royal Architectural Museum, Westminster, who died on Monday night last at his residence, St. John's Hill, Clapham Junction. Mr. Varley, who was in his fifty-fifth year, succeeded Mr. Randall Druce, who resigned two or three years ago. He was an architect by profession, and was the eldest son of the late Charles Varley, and grandson of the late John Varley, and one of the founders of the Old Water-Colour Society.

A tower and spire are about to be added to the Roman Catholic Church at Holyrood, near Belfast, from plans prepared by Mr. M. H. Thomson, of Belfast.

The College Hall, which has been erected at Bangor for lady students attending the classes of the University College of North Wales, is to be opened by Lady Penrhyn on October 3. Mr. L. O. Williams, Liverpool, is the architect.

New board schools are to be opened on the 10th inst. at Quarry Bank, Kingswinford. Messrs. Dorae and Son, of Brierley Hill, are the contractors, and Messrs. G. B. Nichols and Son, of Birmingham, are the architects.

The Noble Hospital on Crellin's Hill, Douglas, Isle of Man, was opened by Lieutenant-General Walpole on Tuesday. The hospital and grounds upon which it stands have been presented to the town by Mr. and Mrs. Noble, at a cost of about £8,000. The architects are Messrs. Bleakley and Cubbon, of Birkenhead, whose design was illustrated in the BUILDING NEWS for July 2, 1886. The contractors are the executors of the late William Gradwell, of Barrow-in-Furness. The facing materials are red-pressed bricks and terracotta from the works of Mr. J. C. Edwards, of Ruabon. Shorland's Manchester grates, assisted by Boyle's ventilators, are used throughout the wards for heating and ventilation.

A new branch railway has just been constructed from Drumsoreland Station to Broxburn Oil-works, with a goods station at Holygate. Messrs. T. Pate and Sons, of Airdrie, were the contractors.

A life-sized statue of the late Hon. F. J. Tolle-mache is to be placed on St. Peter's Hill, Grantham, to harmonise with the existing one of Sir Isaac Newton. The estimated cost is £1,200.

The parish church of Dent, Yorks, is about to be restored from plans by Messrs. Paley and Austin, of Lancaster.

The foundation-stone of new Roman Catholic schools at Weston, near Runcorn, was laid on Tuesday. The school will be 40ft. by 20ft., and will accommodate 100 boys and girls. Mr. Thomas Kirkham is the contractor.

The tender of Messrs. H. Dorae and Son, of Cradley Heath, Brierley Hill, has been accepted for the erection of a Primitive Methodist chapel and school in connection with Bourne College, Quinton near Birmingham.

Mr. Goschen has sanctioned the purchase for the British Museum of the greater portion of the collection of Indian coins formed by Sir Alexander Cunningham, who was for thirty years at the head of the Archaeological Survey of India. The collection is chiefly of gold and silver coins, and embraces the period between the time of Sophyte to the English conquest.

The tower of the village church of Kimpton Herts, is now being restored by Mr. John Thomp-son, of Peterborough, from plans by Mr. J. Oldri Scott.



## THE BUILDING NEWS

AND ENGINEERING JOURNAL.

VOL. LV.—No. 1758.

FRIDAY, SEPTEMBER 14, 1888.

## THE SYMBOLISM AND ICONOGRAPHY OF EARLY AND MEDIAEVAL CHRISTIAN ART.

By GEORGE ASHDOWN AUDSLEY, F.R.I.B.A.  
(Author of "Handbook of Christian Symbolism,"  
and several works on Architecture and Art.)

IT is, perhaps, not too much to say that the intelligent appreciation and study of the works of Early and Mediaeval Christian Art are quite impossible without a clear insight into, or knowledge of the symbolic language which everywhere pervades them, and to which so much of their life and expressiveness is due. Wherever we concentrate our observation on the glorious works of Christian art—be it on the great ecclesiastical structures in stone, the brilliant fields of storied glass, the frescoed or mosaic-covered walls and domes, the glittering pages of illuminated manuscripts, or the countless masterpieces of the embroiderer's, the enameller's, and the metal-worker's arts—there we find the language of symbolism written in no timid characters, albeit those characters may be but imperfectly understood by him who looks to admire or condemn the outward forms rather than to appreciate and realise the meaning and teaching which underlie the whole. As the Abbé Auber says:—"The religious symbol—the idea which takes form at the creative breath of the plastic art—is to be everywhere seen in the Christian world. It has always played a highly important part therein, though this has only been perceived by the small number of students who have given serious attention to the fact, and even by them only to a limited degree. The majority, on the other hand, have always declined to notice this mysterious laconicism of Christian Art, which has so much to say, for those who can read it, even on a small piece of stone."

There is no question that a widely-spread ignorance obtains at the present day with reference to this branch of art study, fostered in the generality of instances under the conviction that it amounts to little in the end, and that it is, from first to last, painfully dry and uninteresting. Students and lovers of the works of the great epochs of Christian art would do well to bear in mind that it is about as easy to open a hold-fast safe without the key to its complicated system of bolts, as to unfold the meaning and realise the full expression of the works of the Mediaeval artists without the key to the symbolical language in which their ideas are set forth. To all those who are interested in the development of Christian art in the past, and its advancement at the present time, the study of the Symbolism and Iconography of both the eastern and western churches is of the highest importance and interest. We venture to think a very superficial survey of Christian art will be sufficient to prove this; whilst we are certain that a concentrated survey of one or two of the more important works which have been spared to us from the Middle Ages, will convince anyone blessed with an open mind and a fair amount of artistic culture, that the study of the symbolic language, which has so long been a handmaid of our religion, cannot fail to interest and benefit the student, and especially the student of architecture.

To give even the faintest outline of the symbolic and iconographic systems which are presented by such buildings as the cathedrals of Chartres and Bourges, in France, St. Mark, at Venice, and Monreale, in Sicily, would require a series of very elaborately

illustrated articles, and, these, we regret to say, cannot be contemplated here; but it is quite in order that some information should be forthcoming, in this introductory article, as to the sources from which such complete systems were derived. First, however, it is, perhaps, desirable that the reader should be in a position to form some mental idea of the extent to which such systems were carried by the artists of the Middle Ages; and the following remarks by M. Didron, whose writings on Christian Iconography and art we highly respect, notwithstanding that we are bound to differ from some views expressed therein, will convey, in a few words, the information necessary:—"Between the 9th and 17th centuries of our era, and under the inspiration of Christianity, the arts of the sculptor, carver, engraver, painter, and weaver were devoted to the production of innumerable statues and sacred objects for the adornment of cathedrals, parish churches, chapels, colleges, abbeys, and priories. Certain large churches—such as those of Notre-Dame, at Chartres, the cathedrals of Reims, Paris, and Amiens, were ornamented with two, three, or four thousand statues of stone; and, as in the case of those of Chartres, Bourges, and Mans, with three, four, or five thousand figures painted on glass. Formerly there was not a single church, however small, which did not possess thirty, forty, or a hundred figures in sculpture or painting. If we, then, take the mean between the lowest and the highest numbers, and multiply it by the number of the sacred edifices which existed in France prior to the heretical devastations of the 16th century or the political destructions of the 18th century, we can comprehend the importance which Christianity had accorded to the plastic and decorative arts. Of these figures and other works, executed by sculptors, carvers, or painters, the inclemency of the seasons, the course of centuries, and the revolutionary ravages of man have singularly diminished the number; but the entire iconographic series represented at Chartres and Bourges are still in existence. About three-fourths of the original series at Lyons remain; whilst rather more than half of those which adorned the Cathedral of Reims and Strasbourg are still preserved. The great cathedrals, or those which were most crowded with worshippers, were better protected from ravages of all kinds than were the churches of the second or third order; accordingly France is at the present day incredibly rich in statues and painted glass. The single city of Troyes contains no fewer than nine churches lighted entirely by stained-glass windows, painted with sacred histories, executed between the 13th and 17th centuries."

In addition to the matchless iconographic system presented by the sculptures of Chartres Cathedral, we must recognise the rich field of study offered by its wonderful stained glass. A simple enumeration of its windows will convey an idea of its wealth in this direction. There are, of 12th-century date, three singularly rich and noble windows. Of 13th century date there are one hundred and twenty-five large windows, three immense roses, thirty-five lesser roses, and twelve small roses. Of the 14th century there are six large windows and two medium-sized roses; and of the Renaissance period there are two small roses. In all, one hundred and eighty-five grand windows, presenting thousands of portraiture, histories, and symbolical subjects. On the iconography of these windows we shall have to speak in future articles.

The mosaic decoration of the cathedrals of St. Mark, at Venice, and Monreale, near Palermo, also present fertile and highly interesting fields of study to the lover of Christian Symbolism and Iconography, as will be seen during the progress of our present treatise.

Now let us direct attention to the more important sources from which the artists of the Middle Ages, in Western Christendom, derived the inspiration which led to the production of such wonderful and systematic iconographic series as those just commented on. Didron was the first to direct attention, in our day, to these sources; and all subsequent writers on, and students of Christian art must acknowledge their debt of gratitude to him.

During the eleventh and two following centuries, numerous works were written by men deeply learned in the theology, legends, philosophy, natural history, and the arts and sciences of their times, and a mania for classification seems to have seized them all. This was the encyclopedic era, which gave birth to ponderous tomes—agglomerated treatises on every subject, divine and human, natural and supernatural—into which the builders of churches and the artists employed in their adornment eagerly dived for guidance and inspiration. The most noteworthy of these works as well as most esteemed in their time were the *Summa Theologicæ*, of St. Thomas Aquinas; the *Speculum Universale*, of Vincent de Beauvais; the *Legenda Aurea*, of Jacques de Vorage; and the *Historica Scholastica*, of Pierre Mangeur. In the *Summa Theologicæ*, St. Thomas collected and classified all the theological learning of his own and previous epochs; in the *Legenda Aurea*, Jacques de Vorage gathered all the sacred legends and histories which were, up to his time, scattered in numerous manuscripts, or which had been handed down by oral tradition; in the *Historica Scholastica*, for the first time the historical parts of both the Old and New Testaments were brought together, to inspire artists in the graphic rendering of their "sacred histories"; and in the important *Speculum Universale*, Vincent de Beauvais, the preceptor of the children of St. Louis, and probably the most profound scholar and philosopher of the thirteenth century, classified all human knowledge in accordance with a system or plan unequalled up to his day, and probably unsurpassed since. Here, then, as in vast storehouses, lay piled up an immense mass of suggestive and well-arranged material, that the artists of the greatest church-building epoch the world has ever known had only to seek for to find.

It is sufficient for our present purpose to take one of these great encyclopedias, preferably that of Vincent de Beauvais, and opening its pages, glance therefrom to the iconographic system of Chartres Cathedral. Without literally quoting Didron in his treatment of this subject, it is desirable to follow him in his method of instituting the comparison between the work of the great encyclopedist and the systematic iconography of Chartres.

Vincent de Beauvais adopts a strictly chronological system, ingeniously interweaving with it dissertations on all branches of human knowledge and labour. His method of classification with reference to natural objects is an admirable one. He begins by speculating on the foundation of all things, telling how God alone existed in His eternal being and illimitability. Then how the Creator, desiring to behold Himself reflected in His works, and to receive love and adoration henceforth, called the angels into existence. Here Vincent pauses to contemplate God, and consider the nature and the attributes of Divinity; then passes on to the first act of the Creator, and speaks of the celestial and infernal spirits, the earliest of created beings. Vincent now descends to the visible world. God creates the heaven and the earth, and then follows a treatise on geography and mineralogy. The creation of the sun, moon, and stars introduces a dissertation on astronomy, and, in accordance with the philosophy



of his age, a treatise on astrology. Appended to the day in which the vegetable world is called into existence is a treatise on botany and its application to agriculture and horticulture. The creation of the birds, beasts, and fishes is followed by a treatise on zoology. Now man is called into being, and Vincent indulges in a learned disquisition on the physical and mental powers of the human body, on anatomy and physiology, and on the different races of mankind. The seventh day has come, and God rests. At this point the encyclopedist pauses to examine and discuss the disposition, beauty, and harmony of the universe.

Then comes the disobedience and the fall of man, disturbing the harmonious scheme of creation; and for the first time the powers of nature break their bonds, and human passions assume their potent sway. Here Vincent closes his first section or "Mirror of Nature."

Man has fallen away from his original perfect state, but he has still the means to restore by science much of what he had lost; so the indefatigable encyclopedist opens his second section—his "Mirror of Doctrine"—by teaching man to speak, to reason, and to think. Then follow treatises on grammar, logic, rhetoric, geometry, mathematics, music, astronomy, and other sciences, with their application to the economy of domestic and public life, and to the mechanical arts, to architecture, to navigation, the chase, to commerce, and to medicine. Order and progress are observed everywhere.

Now, Vincent opens his "Mirror of Morality." He teaches mankind to walk according to both the laws of God and man: he points out his duties by instructing him in all the moral virtues, and proceeds to discourse on them all in separate essays. Man, he says, must have faith, hope, and love; and he must be chaste, humble, meek, patient, temperate, courageous, and prudent. The award of his virtues will be the happiness of heaven, and here the encyclopedist proceeds to describe that marvellous happiness as an incentive to good works. Then, as might be expected, he draws the other side of the picture in discourses on purgatory and hell, where all classes of sins receive their award. Not a single moral treatise is overlooked in this "Mirror" which has any real claim on the mind.

In the fourth and concluding section of his great work, entitled the "Mirror of History," the encyclopedist writes, with no timid pen, the universal history of mankind. He commences at the gates of the terrestrial Paradise just as Adam and Eve are driven forth to work out their doom in toil and sorrow, and then passes in review the history of all the branches of the human race, in all epochs, until he reaches the year 1244, that in which his own labours were brought to a close. Up to this point Vincent had developed everything worthy of his consideration on a wonderful system—analytical, chronological, natural, and historical—which must have greatly impressed the scholars and artists of the 13th and immediately succeeding centuries.

The past had been fully treated of, and the lore of all nations and periods had been studied, and stored up in the pages of his voluminous work for the instruction of coming generations, yet Vincent de Beauvais did not lay down his pen. The knowledge of and insight into the workings of nature and the thoughts and actions of mankind led him, with almost prophetic power, to speak of the future. So his book is continued until it ends with the destruction of the universe and the final judgment day. As Didron says:—"He tells us when time shall be accomplished, when the universe shall be destroyed; when the whole human race shall be judged; and when eternity shall recommence, only having been interrupted by the

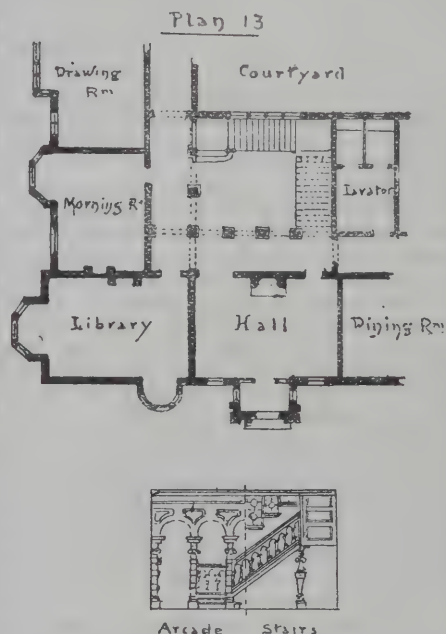
creation of the universe and the history of mankind. He also comments on the end of the world, and its destruction by water or fire; and he predicts all the phenomena that will precede the last judgment." With this awful subject he closes the *Speculum Universale*.

In our next article we shall endeavour to show the good use which the sculptors of the cathedral of Chartres and other important churches made of this remarkable book, and the other classified and encyclopedic writings of their times. It is only by a careful tracing of the sources of inspiration in such matters that the archæologist can hope to read aright the sermons in stone which meet his eyes in the great Christian temples of the Middle Ages.

(To be continued.)

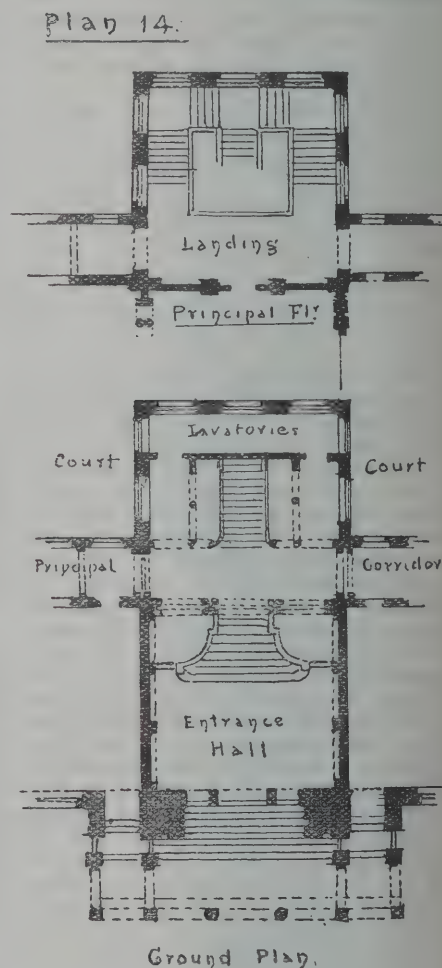
#### HALLS AND STAIRCASES.—V.

IN the present article we propose to discuss the architectural aspect of halls and staircases when they are placed in a central position or removed from the outer walls, and we may first consider the arrangement with regard to private residences of a large class. The entrance hall and staircase generally form a central feature of the plan, lighted by a lantern or skylight in the roof, as we observe in most Classic residences, with reception rooms on each side; or they may be so situated in the interior as to receive



light from an open court. Several notable examples of houses with central stairs will occur to most of our readers. Blenheim Palace, by Vanbrugh, with its large central hall in the axis of the portico, and the lateral staircases, one on each side; Kedleston Hall, Derbyshire; Longleat House, of the Early Renaissance era, by John of Padua; Wollaton House, with its great central hall; Holkham House, and a score of other domestic edifices of the 17th and 18th centuries may be enumerated to show how important and public a position was assigned to the hall and stairs. Longleat is a capital instance of a plan with open courts in the centre, between which is the staircase, a double open newel arrangement projecting from the cloister or corridor. But this palatial style of hall-planning is no longer the fashion. The hall and staircase have both dropped from their high position to one of lesser significance. Though central, it is not emphasised externally, or it may, in fact, be rather on one side of the main axis of the building.

Many of the old buildings in London have, or once possessed, admirable staircases. One of the finest of the Domestic class is that in Stafford House, on the plan of the letter *m*, a central flight and two others branching from it, supported by the side walls of hall. The hall was adorned by columns. The well known staircase at Ashburnham House, by Inigo Jones, is an elegant example of stair-planning, and that master of the English Renaissance knew how to make the most of a limited area. The stairs open out of one side of an inner hall about 23ft. by 17ft., to which they are made central by ten steps; there is then a quarter space or landing; another three risers to the right hand gain ascent to a half-landing. Turning to the left, the visitor ascends the next parallel flight of nine risers, where there is another quarter landing. Keeping to the left he ascends eight more steps, making in all thirty risers to the first



floor, giving access to the ante-room, grand drawing-room, and dining room. The flights are thus broken up into four flights, one of ten risers, one of three, a third of nine risers, and a fourth of eight risers, the bottom and top flights parallel to each other, also the second and third parallel, but at right angles. The staircase hall is, in fact, L-shaped, 23ft. 7in. long one way, and 21ft. 9in. the other; the flights are about 6ft. wide. Two back windows light the main flights, which are on the newel plan. A very easy gradient is given to the steps, which are 5in. rise, and 14in. treads; Ionic pilasters adorn the walls of staircase, and one isolated column with its engaged pilasters forms a kind of screen between the staircase and the upper landing. There was a coved ceiling and an elliptical lantern supported by Ionic colonnettes grouped in threes.

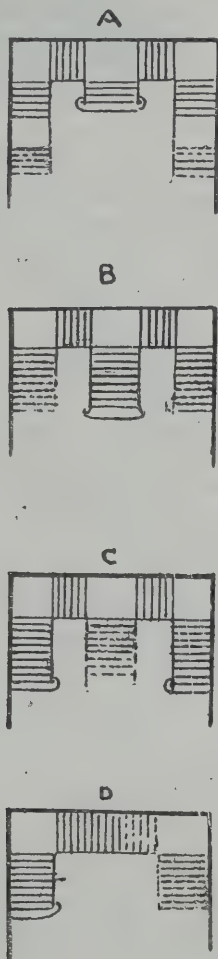
The chief point to strike the visitor in this unique example of staircase arrangement is the manner the real staircase hall is



approached from the inner hall by a short projecting flight of ten steps at right angles with the main stairs. The staircase proper begins when the visitor had ascended the first two flights of thirteen steps; it is then the beauty of the design reveals itself, and the elegant recessed landing with its isolated column at the top becomes visible. The top flight is at least 7ft. wide, the second from the top under 6ft. wide.

A convenient position for a staircase is at the junction of two corridors in a large house. Plan 13 shows an effective arrangement: the staircase hall is rectangular, lighted by a window from an inner court, with a screen of columns or arcades continuing the inner lines of corridors. The outer entrance hall is in this case a separate apartment for callers and strangers' reception, the principal reception rooms being grouped round the staircase hall. A central disposition of staircase adapted for a public building is best arranged by obtaining lateral courtyards or areas, on both sides of it, or by allowing the staircase portion to project beyond the rear wall of the building. A dignified and imposing plan of hall and stairs may be thus obtained on the axis of the building or vestibule. Many examples of this arrangement are to be met with in our public edifices. The plan of the flights admits of several modifications. Taking a square-shaped hall, the commencing flight may be arranged central with the entrance, say, of five or seven steps to a square landing, then a right-angle flight also short on each side, and then return longer flights parallel with the first along the walls. This plan is shown in diagram A, and may be called the double open newel plan, and on account of its ease in ascent and descent, and number of landings, is one of the forms best adapted for public use—assembly halls, theatres, picture galleries, and museums. Two distinct flights are provided from the first floor landing, and as they meet within a few steps of the bottom, the lower flight should be made wider so as to allow both streams of people to descend and pass down without confusion or crowding. The wing flights, if long, can be broken in the centre of their length by a landing, as shown in our sketch. From an architectural point of view, this breaking up of the long stair branches with a bottom short flight arranged centrally is decidedly an improvement on the ordinary wall flight, as the raking lines so inimical to repose and architectural dignity of character are less distracting and long. Even such an arrangement as that shown in plan B is more architectural than stairs beginning next one wall and finishing on another (plan D), which is the common mode. The central commencing flight can be arranged to coincide with the axial line of an arch or arcade of three arches, and by curving the lower risers and making a curtail step at the bottom, an inviting appearance is produced. One of the finest examples of this arrangement is the grand marble staircase of old Chesterfield House, the plan of which resembles diagram A; but instead of square open newels, these are made with circular turns, and the steps ascending right and left from the first landing are curved so as to produce an easy and graceful ascent, the corner platforms being omitted. The great staircase of the British Museum is a type of the square arrangement of wing flights; another good example is to be seen at the Fishmongers' Hall. The new stairs to the Mercers' Hall, Cheapside, is a recent instance of a staircase designed on the plan of diagram A; there is a short central flight of six or seven steps from the hall to a square landing; then right and left of this a short flight, with a corner landing, from which long flights parallel with the first, ascend to the first floor; but half-way landings are introduced, as we have shown, which

break their long raking lines. At Freemasons' Hall the same principle is adopted, the side wells having semicircular open newel ends or cylinders and a domical hall. St. James's Hall shows also this plan; but it is needless to multiply examples. Hampstead Vestry Hall has also the same arrangement, which is well suited to the requirements of a public hall. Sometimes the short second flights are all thrown into a single long landing, extending from wall to wall, from which the side flights ascend. In large public buildings we see occasionally a reversal of this arrangement. Instead of one central flight there are two side-wall flights ascending from the hall level, which join one central and often wider flight of stairs to the first floor landing (see plan C). This plan has the advantage of dispersing the crowds descending to the ground floor. It can also be made an architectural arrangement, the flights being disposed symmetrically, and is well



adapted to a columnar hall in Classic-designed buildings. When side corridors communicate with the corner landings, there is reason for adopting this plan in preference to a single ascending flight. When, however, the principal staircase is made an entrance or exit to or from other parts of the building, the first landing or platform should extend the whole width of hall, the centre or wing flights ascending from it. The new Sunderland Municipal Buildings (Mr. B. Binyon, architect) show an arrangement of hall and staircase, lighted by side areas, based on the principle we have been discussing in this article—that of a central and two branching flights. The plan requires space, however. A very well designed staircase suitable for public use is that by the late F. P. Cockerell at the Royal Society of Painters in Pall Mall. In designing a public staircase, the architect should consider first his area, second the apartments to which the stairs are to give access. If the latter are small or only offices,

the staircase may be limited in size and importance; but if the principal rooms are on the first floor, or a public hall or picture galleries are to be approached, the adoption of a spacious and imposing staircase, such as we have described, is called for. Our Plan 14 is a development of the central axial arrangement for a public building, and resembles that of the Birmingham Council House, designed by Mr. Yeoville Thomason. The entrance hall, reached by a flight of steps from the portico, has a broad circular-ended flight of steps leading to the main corridor, from which level the main central flight of the staircase rises, the wing flights supported by small columns. The groups of columns in the outer hall, and the inner screen of columns before the staircase, separate the main public corridor, access to which is gained by the wide flight of centre steps.

## THE TURKISH BATH: ITS DESIGN AND CONSTRUCTION.

By R. OWEN ALLSOP, Architect.

### VI.—HEATING AND VENTILATION.

THERE are two ways in which heat may be applied to the body—by direct radiation, as from the sun or an open fire, and by transmission, as through a volume of air.

The ancient Roman bathers, with floors below them which rested upon *pilae*, or little pillars of brick or tile, around which the flames and hot gases from the furnace played, and surrounded by heated, hollows walls, evidently submitted themselves to the action of a heat that must have been of a more or less radiating character.

So, also, in a less perfect manner the Turks, who employ flues running beneath the floors, and the Moors, who adopt stoves visible to the bathers. Systems similar to the ancient and Oriental methods have been tried in this country.

Theoretically, radiant heat in a bath is vastly superior to that which is transmitted to the body through the medium of the air. Its virtues have been extolled by the late David Urquhart, and other eminent authorities on the bath. "There is a difference," says Mr. Urquhart, "between radiating and transmitted caloric. . . I cannot pretend to treat of this great secret of nature; to work out this problem a Liebig is required. This I can say, that such heat is more endurable than common heat. There is a liveliness about it which transmitted heat lacks. You are conscious of an electrical action. It is to transmitted heat what champagne is to flat beer."

Practically, however, matters take a different aspect. The gain in quality of heat of a purely radiating character is counterbalanced by the difficulty of ventilation in cases where this principle is adopted; whilst the inferior quality of transmitted heat is more than compensated by the gain in point of ventilation which is attained by the full and constant flow of freshly heated air. In a bath the importance of perfect ventilation cannot possibly be over-estimated, as not only has the respired air from the lungs to be removed, but also the deleterious exhalations from the skin which are produced by perspiration. A rapid and continuous flow of pure, dry, freshly-heated air through the hot rooms has, therefore, been found to be the best practical method of maintaining the requisite temperatures. Some day, peradventure, the hypothetical method of employing pure radiant heat may be rendered possible and practicable, and we may be placed in a bath where we shall receive great heat whilst breathing a comparatively cool atmosphere, and thus receive a measure of that electrical invigoration we experience when, in some sheltered bathing cove, we have exposed our bodies to the fiercest rays of the morning sun whilst yet we breathe the fresh, cool, ozone-laden air.

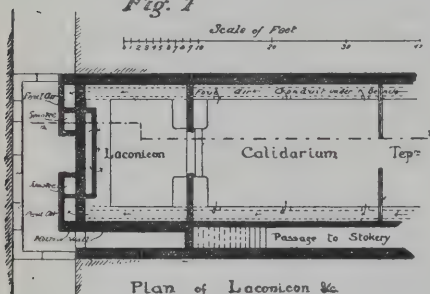
It being demonstrated that the best method of heating a Turkish bath is by the supplying of pure hot air, we must consider the necessary appliances and arrangements. These comprise a furnace in its chamber, with flues or shafts supplying cold, and drawing off the heated, air, and a stoker with provisions for



firing and storing coke, &c. Too often the stokery is unscrupulously cramped, and the life of the stoker thereby rendered anything but pleasant. Its design is a simple matter, and perhaps for that reason neglected. The arrangement and construction of the furnace chamber requires care, and the selection of a stove or furnace great judgment. As regards the latter feature, the most important point to consider is the nature of the heating or radiating surfaces. What will raise the air to the required temperature without, in the process, depriving it in any way of its vitalising elements, and without adulterating it with either smoke and fumes from leakage, or with particles of foreign matter given off from the material employed in its construction?

In theory, again, there would be nothing better than ordinary fire-brick. From this

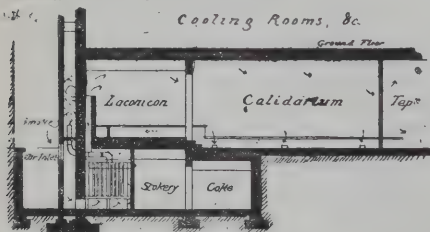
Fig. 1



Plan of Laconicum &amp;c.



Plan of Furnace &amp; Stokery



Section on line A-B

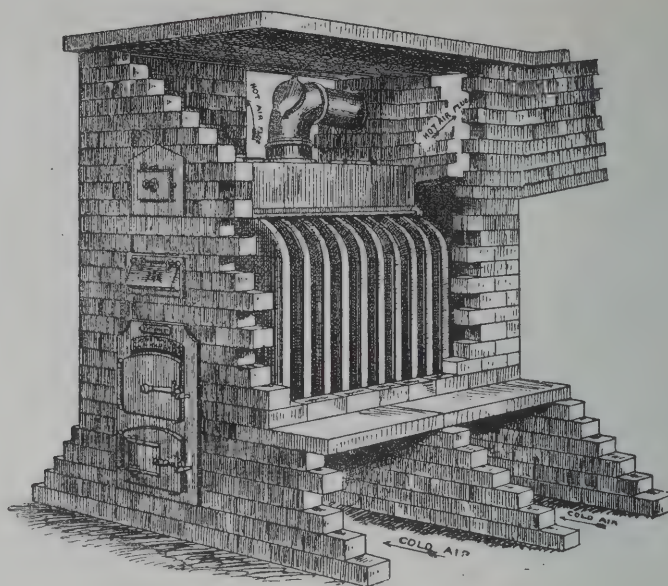
material a soft heat is given off, differing in quality from that obtained from iron. An iron furnace, however, is more economical of working expenses; and, it is asserted\* by some, that hitherto all attempts at the employment of a fireclay furnace for a hot-air bath have had to be abandoned. The constant repair of such stoves, it is said, compels those who have given them a trial to abandon them in favour of those with an iron radiating surface, in spite of the objection that, when super-heated, particles of metal are thrown into the air. Of iron furnaces there are many placed before the public; but though all are doubtless suited to ordinary requirements, there are few that are capable of creditably fulfilling the conditions indispensable for the hygienic heating of the air for a Turkish bath. These conditions may be summarised as follows:—

1. A maximum of heating-surface, with a minimum of grate space.
2. Perfect immunity from the danger of leakage from the furnace into the hot-air chamber or conduit.
3. Freedom from the defect of liability to over-heat the air.
4. Inability to adulterate the air by throwing off matter from the heating-surfaces.

Such primary essentials must be constantly borne in mind by the designer of furnaces for

\* With questionable accuracy. In my next article I shall humbly endeavour to show how a fireclay furnace might be constructed with satisfactory results. Not being prepared with the illustrations, I am compelled to continue the subject of "Heating and Ventilation" in my next, trusting that the reader will pardon the consequent diffuseness.—R. O. A.

Fig. 2



the hot-air bath. Their importance must be obvious to all.

Of the many iron stoves Messrs. Constantine's "Convolut" stove has been adopted the most frequently as an eminently practical furnace for the effective heating of sudatory chambers, and maintaining very high temperatures in the laconicum. The appearance of this stove is familiar to all architects, and it will be unnecessary, in these pages, to minutely describe its construction, as, being largely employed for general warming purposes, most persons are acquainted with it.

The method of constructing a furnace suitable for a small public bath is, however, shown at Fig. 2. The excavations for stokery and heating chamber being completed, and the position of the furnace determined, a solid foundation of concrete must be prepared, upon which the brickwork to support the stove must be laid. At the same time the foundations for walls of furnace chamber, stokery, coke store, and the side walls for the horizontal cold-air-conducting flues will be prepared. These latter must then be built in half-brick with glazed interior face, and the furnace inclosed in similar work as shown in perspective sketch. The flues must be covered with York stone slabs 3in. thick, up to within three inches or so of the convolutions of the stove, at which distance the side walls of the furnace must be erected, the back one similarly, and the front one round the four projecting doors, which are, respectively, the ash-pit door, the fire door, and two doors for cleansing the horizontal smoke-box and interior of convolutions. The furnace walls must be continued up till a few inches above the bend of iron smoke flue, and then—if, as shown, the furnace be small—covered with a 4in. York slab in one piece. If the furnace be large, a flat brick arch must form the covering as shown in Fig. 1, where this arch supports the flooring of the laconicum. The openings for the admission of the heated air into the conduit leading into the hot rooms may be either directly above, as shown in the last-named illustration, or in the side, as in Fig. 2, with inclined flues. As a rule, it is more economical, in heating, to place the furnace below the level of hot rooms; but if desirable to place both on one level, the back wall of the furnace chamber becomes the party wall of the laconicum, and it must be stopped short of the ceiling, and the air debouched over it.

In cheap baths the interior face of furnace chamber may be of stock brickwork; but best glazed work should be adopted in good ones. All hot and cold-air ducts should be similarly lined with glazed ware. In first-class work the floors of horizontal and inclined flues should be of white glazed tiles set in cement. Manholes must be provided for cleaning when necessary. Every portion of furnace chamber, flues, shafts, and conduits for hot and cold air must be "get-atable" either by means of manholes or by long

brushes. Air-tight doors must be indicated on plans wherever this necessity demands them.

The iron smoke-pipe from furnace must be conducted to the smoke flue, and the connection between furnace chamber and flue hermetically sealed. The walls for a small furnace chamber need not be more than 4½in. thick. Large furnaces require walls one-brick thick.

The cold-air flues leading from either side of the furnace must be conducted to their respective inlets. If possible, at least two inlets should be provided, facing different ways: this with regard to the possibility of certain winds sucking the air out where it is wanted to enter. The openings should be vertical, like windows, and in cities furnished with a solid frame and casement, fitted with louvres of

Fig. 3

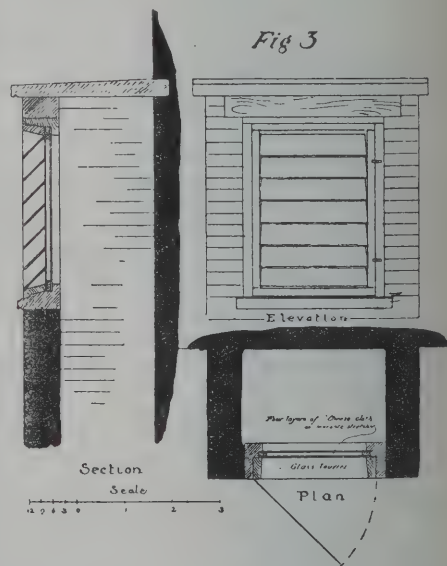


plate glass with polished edges. Between the rebate and the casement it would be a good plan to leave a space of an inch and a half for a movable stretcher-frame holding several layers of "cheese-cloth" to filter the air. The construction of such an air filter is shown at Fig. 3. The glass louvres keep out the wet, and throw off coarse particles of falling soot; and the provision of a movable stretcher would allow of the cloths being frequently changed for clean ones—a very important point, though little attended to, if not, perhaps, wholly ignored.

The position of air intake is a matter of great importance, especially in large towns. It evidently is bad to draw a supply of air from the bottom of an area. Even the position shown in Fig. 1 is not good; the shaft should be

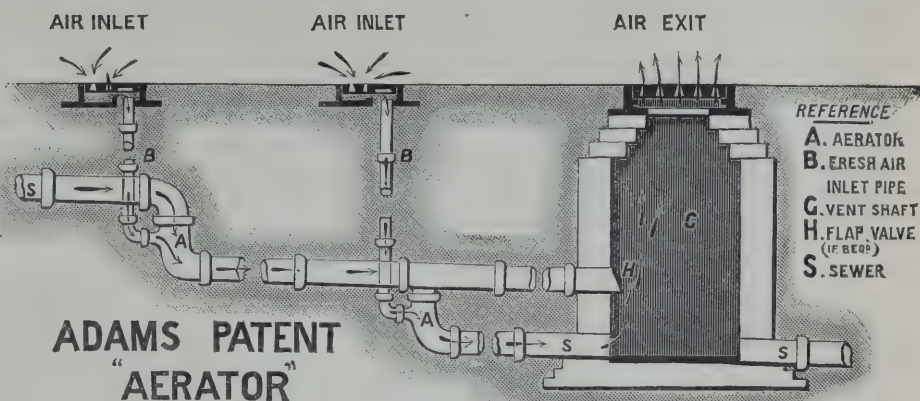


carried higher. The best places for the intakes are where there is always a current of pure air blowing, and away from smoky chimneys. Theoretically, it would seem that the higher the level of intake the better; but in cities, by going high we get among the belching chimney-tops, even if we escape the stagnation below. Moreover, a high inlet with a strong wind tending to exhaust the air in shaft might find the architect with the cold air sweeping through his bath, and all the heated air rushing up the supply-shaft. A large "lobster-back" automatically turning towards the wind, would in many cases prevent such a disastrous result. Even in low-level intakes, as I have said, trouble will sometimes arise from the same cause. This may be remedied by providing more than one inlet, so that only the one facing the current of air will be employed, the other being closed, which could be effected by fixing the glass louvres, spoken of above, on pivots, and connecting them with a rod and adjustable rack. It would be a very simple matter to make the wind itself automatically open and shut the louvres.

The theory of the heating and ventilation of the hot rooms requires most careful study, and the particular scheme to be adopted in any new bath must be well considered with respect to the restrictions of the site. At Fig. 1, I have endeavoured to show how to make the best\* of what is perhaps a bad job; the site only admits of ventilation at a back area: it is impossible to construct flues anywhere else, and the fresh air must be drawn from the same area. On the ground floor are cooling and dressing rooms; the bath rooms are in the basement, and the furnace in a sub-basement, reached from a passage at the end of the stairs for the bather. Two convoluted stoves are shown in a vault; three air-inlets are provided, and the foul air is drawn up into the smoke flues, two in number, which, above, could join one another. Let us follow the air in its passage through the bath. Entering at the intakes, any coarse impurities are thrown off by the smooth louvres, and the tendency of finer particles to rush in is checked by the stretched canvas cheesecloths, and, thus deprived of its actually visible impurities, the air passes through a longer or shorter conduit of glazed brickwork until it reaches the horizontal flues running to beneath the furnace walls, along which it is rapidly drawn, and, ascending between the walls and heating surfaces and between the two adjacent heating surfaces, absorbs the radiating heat and enters the laconicum by way of the rectangular shaft constructed above the vault spanning the two stoves.

Questions of temperature I will omit for the present. The air, on passing through the laconicum, will be practically pure, as it is in such great bulk compared with the number of occupants of this highly-heated chamber, and it will not be absolutely necessary to provide ventilators. These should commence to be placed in the caldarium, and should, in the scheme of ventilation here considered, be so disposed that the nearer they are to the lavatorium and shampooing-room, the more frequent will they become. The object of this disposition of outlets for vitiated air is, that the cross currents thus created may not interfere with the main flow from the heating chamber to the lavatorium. Were too many ventilators to be placed near the hotter end of the sudatory, this stream would be diverted. Too much of the freshly-heated air would flow out at these points, and the onward movement of the air would be enfeebled. There would then be difficulty in maintaining the heat in the tepidarium and lavatorium.

In passing onward through the various rooms two changes are wrought in the air: it loses so much of the caloric with which it is charged for every foot it travels, and it becomes laden with the exhalations from the lungs and skin of the bathers. A large proportion of carbonic acid is thrown into the air, and as the normal temperature of the human body remains, in a healthy person, at about 98° Fahr., and rises but a few points even when submitted to the action of heat, these exhalations, in addition to being heavier than air, are very much below the average temperature of



a sudatory chamber. Consequently they fall, and must be extracted at the floor level.

The total area of the outlets for vitiated air should be about equal to the area of the narrowest part of the shaft that conducts the fresh, hot air from the heating chamber. Thus, supposing the latter to be 10 superficial feet, and the size of outlet ventilators a clear 12in. by 3in., there may be 40 ventilators disposed round the bath-rooms, say, eight in the caldarium, 14 in the tepidarium, and 18 in the combined shampooing room and lavatorium.

In the diagrams at Fig. 1 the foul-air conduit is the space comprised under the marble-topped benches running round the hot-rooms. At the end of the laconicum they enter flues, which I have shown as running side by side with the smoke flues.

The purity or foulness of the air in the hot rooms forms all the difference between a good bath and a bad one, which latter is infinitely worse than no bath at all. There exist, at the present time, scores of baths where the foul odours of the sudatory chambers are nauseating. Such foulness arises from stagnation of the air. There is no continuous flow, and the respirations and exhalations of the bathers are not removed. A system of ventilation may be pointed out, but it is on the wrong principle, and does not act. There is no change of air. The atmosphere of such places becomes pestilential.

I therefore make no apology for continuing the subject of "Heating and Ventilation" in my next article, when I will give diagrams of methods of ventilating hot rooms on sites where one is not so handicapped as at Fig. 1. Moreover, there remains to be considered the heating power of furnaces, the amount and rapidity of the flow of air through the bath, the variations of temperature, and other important questions.

(To be continued.)

#### ADAMS' PATENT SYSTEM OF SEWER VENTILATION AND AERATOR.

BY means of the patent aerator shown above, a continuous inflow of fresh air to the sewer is obtained, the air thus carried into the sewer reducing its temperature, and by purely natural means (the dilution and oxidation of the gases) relieving the sewer of its noxious gases.

The aerator A is placed on the direct line of sewer or drain, all liquid passing through it; an air pipe, B, is connected, as shown, and carried up to level of road, where it is protected by a small iron ventilating cover. The sewage as it flows through the pipes enters A and passes out into the lower sewer, in its passage through the apparatus A, setting up an even and continuous current of air from the air inlet pipe B to the sewer, taking the direction indicated by the dotted arrows. This current is constant so long as the sewage flows, and exerts its influence for good over the whole length of pipes, varying only in power with the increasing or diminishing flow of liquid through the pipes.

A practically unlimited supply of air may be fed to the main sewer by fixing an "aerator" on each house drain; this is the most simple mode of aerating old sewers where the apparatus cannot perhaps be placed on the main line.

The minimum fall, about twice the diameter of pipe, gives a steady flow of air down the pipes. Where greater fall can be given, an increased effect is obtained by inserting a lengthening piece. This is not necessary to the efficient working of the apparatus.

The flow of sewage along the drains gathers impetus in its passage through the aerator; this will, in a large degree, be an equivalent for the flat gradient upon which a drain may be laid for the sake of actuating the ventilating apparatus.

#### SKETCHES OF A FEW CHAIRS.

WE illustrate a few Chairs sketched a short time since. The white and gold Sheraton Chair is a beautiful example of refined and quiet design. The Italian carved oak Chair is quaint and well carved. The Century Guild Chair is a most curious design, very difficult to make, as the back panel requires delicate workmanship, showing a species of water-lily growing up to the surface of the water and intersected by the long green leaves. The Arm-chair next is a mixture of styles, but quaint, nevertheless. The little Chair below is a modern copy of an old Dutch example. The Chair next it is easily recognised as of Chippendale's make by the characteristic plume, &c. It is interesting to note the art and workmanship as set forth in these different chairs; in nothing does the spirit of the age show forth more than in a chair. For instance, may be noted the sturdy character of the old English oak work, and the changed style and design in those used by the fine gentlemen in the last century, made by Sheraton, Chippendale, and others.

#### OLD OAK CHAIR, MAIDENHEAD.

THIS measured sketch of an old oak Chair, by Walter Peart, belongs to Mr. J. Lee, of Maidenhead, in whose possession it has been for nearly twenty-five years. The chair has had a new scroll to the left arm many generations since, its only repair. The back may have been surmounted by an ornamental scroll to indicate its ownership, for there is an unevenness at the top surface of the rail, which suggests that a portion may have been removed. It is of English oak, and the inlay interlacing pattern in top rail, styles, and on arms, appears to be in boxwood. The royal characters and the figures of date are of black wood or black mastic. The inlay patterns on the back are in coarse-grained black oak, and the cone-like figures in them are of elder or acacia wood.

A new tower has just been completed at the parish church, Rawtenstall, from designs by Mr. Lawrence Booth, of Manchester. The tower is in the Early English style, harmonising with the church, but of a more ornate character. An octagonal turret at the north-east corner of the tower contains a stone staircase leading to the several floors, and forms the most prominent feature, being carried up considerably higher than the pinnacles at the other corners. A peal of eight bells and a clock with four dials are ready to be placed in the tower. Mr. S. Hobson, of Rawtenstall, was the builder.

Mr. John P. Roe, for many years engineer to the Consett Iron Company, died on Saturday at his residence at Consett, Co. Durham, aged 73 years.

\* Not quite the best, as with a more elaborate method of extracting the foul air the arrangement could be considerably improved, as I shall subsequently show.—R. O. A.



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## ILLUSTRATIONS.

THE VATICAN LIBRARY, ROME.—NEW SUNDAY-SCHOOLS, WORCESTER.—LONDON AND SOUTH-WESTERN BANK.—FIRST AND SECOND-CLASS WORKMEN'S DWELLINGS.—CHAMBERS MEMORIAL, EDINBURGH.—A PRIEST'S STOLE.—OLD OAK CHAIR AT MAIDENHEAD.—SKETCHES OF OLD CHAIRS.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## THE VATICAN LIBRARY, ROME.

THE first literary treasures of the world are contained within the presses of the Great Hall of this renowned library, illustrated by our double-page plate to-day. This Hall is, in fact, one of the most magnificent of its kind, and may be described as almost unique for the splendour of its decorations and richness of its contents. The apartment measures 230ft. in length and 56ft. wide. It has a double-vaulted ceiling supported by pilasters, and is richly decorated with frescoes and arabesques by Scipione Caletani, Paris Nogari, Cesare Nebbia, and other artists. The paintings on the walls represent on one side the foundation of the most celebrated ancient libraries, and on the other side the different councils of the Church. The panels on the pilasters illustrate the inventors of the characters or letters used in expressing the principal known languages. Between these piers are arranged a number of handsome presents sent to the Popes of this century. The marble pavement adds to the grandeur of the building, and was laid by Pius IX. as a substitute for the old red-tiled floor left by Pius VI., who otherwise completely renovated and restored the fabric. The modern works of art contained within this Hall include two fine tables of granite supported by bronze figures by Valadier, and seen in our view; a beautiful column of *alabastro fiorito*; two candelabra of Sèvres china presented by Napoleon I. to Pius VII.; a fine vase from the same factory to Leo. XII. by Charles X.; a vase of malachite by the Emperor of Russia; the Sèvres porcelain baptismal font of the Prince Imperial, sent to Pius IX. by Napoleon III.; a magnificent tazza of Scotch granite presented by the late Duke of Northumberland to Cardinal Antonelli; a very large malachite present by Prince Demidoff; two handsome vases of Meissen porcelain, with views of the royal residences near Berlin, presented by the King of Prussia to Pius IX. in 1860; a fine vase made in Rome from a block of Oriental alabaster, sent by a Pasha of Egypt. Out of the door to the right is the Archivio Secreto, where are preserved the most interesting manuscript historical documents connected with the government of the Papal See, with the diplomatic correspondence of the Popes, &c. This door is a grand specimen of modern intarsia work, with views of the four principal monuments erected during the reign of Pius IX.—the Viaduct of Lariccio, the Basilica of St. Paul, and the tabernacles of the latter church and of the Lateran. The galleries which open from the extremity of the Great Hall occupy a length of 1,200ft., and are divided into several halls, each more or less

elaborated with paintings and works of art. Thus on the end wall of the second hall is an interesting view of St. Peter's as designed by Michael Angelo. In the Museo Cristiano are collections of Early Christian art from the Catacombs, followed by others of almost every style, date, nationality, and character too numerous even to mention here. This photographic illustration of the Great Hall cannot fail to be valued by our readers.

## NEW SUNDAY SCHOOLS, WORCESTER.

THIS building is being erected for the purposes of a Sunday school over, and to accommodate over 400 children. The central hall and gallery is for assembly and discussion, and round it on the ground floor are ten classrooms for boys, and a similar number above for girls, each provided with a separate entrance and the necessary conveniences. Two larger rooms with a separate entrance are also provided for young men's Bible class and other purposes. The boys' entrance is shown in the view. There is also a small library, and kitchens in the basement. The whole is heated with hot water. The building is faced with buff Ruabon bricks and Bath stone dressings. The builders are Messrs. Wood and Sons, of Worcester, and the foreman is Mr. Shepherd. The cost is about £3,500. Mr. Aston Webb, F.R.I.B.A., is the architect.

## LONDON AND SOUTH-WESTERN BANK.

THE site on which these premises have been built has a frontage of about 50ft. in Fenchurch-street and 42ft. in Gracechurch-street. Part of the latter frontage is let off for shops, and other parts of the premises on the upper floors are let as first-class offices, for which the situation is well fitted. The building is provided with a lift to each floor, and is wired so that the same can be lighted throughout by electricity as well as gas. The bank occupies all the frontage in Fenchurch-street for the ground floor and basement, the depth being rather more than 100ft. This is not only lighted from the front, but also from Ingram-court, and by a large glazed lantern in the centre of the building. In this space is contained the lofty banking hall, manager's room, sub-manager's room, waiting room, and private staircase leading to boardroom. The walls of banking hall are scagliola, with a panelling of teak to a height of about 8ft. The columns are also of scagliola. The fittings are of teak, and the floor is of oak in narrow widths, with the exception of space for the public in front of counter, which is laid with a very elaborate mosaic floor containing the arms of the counties with which the bank does business, executed by Messrs. Rust. The gas fittings are of brass, designed both for electric light and gas. These have been designed by Messrs. Strode and Co., of 48, Osna-burgh-street, Regent's Park, and are most suitable to their purpose. In the basement are lavatories, &c., and the sub-basement is constructed for the engine for the electric lighting. The several strong rooms have been fitted throughout by Milners' Safe Company, which is a guarantee of their excellent workmanship and security. On the first floor is a board-room, with waiting room attached. These rooms are panelled with oak to their full height, and the ceilings panelled in plaster. On the second floor a committee room and lavatories, &c., for the use of the board. All the part occupied by the bank can be shut off from the rest of the building by iron doors. The main entrance to the bank is from Fenchurch-street, but there is also an entrance to the bank from Gracechurch-street, which is the main entrance to the public offices in the building. On the first and second floors are spaces fronting Fenchurch-street, about 50ft. by 30ft., suitable for division into offices for a public company or great mercantile firm, and all the offices throughout the building, some of which are already let, are well lighted, and in every way desirable. The walls of staircase, corridors, and lavatories have been covered with ornamental tiling, by Mr. J. C. Edwards, of Ruabon; and Messrs. Campbell, Smith, and Co., have supplied the stained-glass windows. The warming of the bank is by low-pressure steam, and for the offices stoves are used wherever practicable; inlets for fresh air have been contrived through the story-post in banking hall. Portland stone and grey granite

up to window-sills have been used for fronts, and the roof is covered with copper by Messrs. Ewart and Son, of Euston-road. The staircase is of easy rise, and is of iron and concrete with stone treads. The centre space where the lift works is inclosed with an elegant ornamental wrought-iron railing and gates. Iron is used largely in the construction. The general contractor is Mr. Shepherd, and the work has been carried out from the designs of and by the late Mr. T. S. Edmeston, up to the date of his untimely decease, and since then it has been continued and conducted to the conclusion under the superintendence of Mr. E. Gabriel, Mr. W. Tookey has acted as clerk of works.

## MODEL VILLAGE, AINTREE.

LAST week we published the first premiated plans, by Messrs. Sugden and Son, for Mr. Hartley's new model village houses, to be built on the "Reynolds Farm" estate, next his works at Aintree, near Liverpool. We to-day give a sheet of drawings illustrating the houses planned by Mr. Frank W. Mee, architect, of Manchester, and for which the second premium was awarded. The plans show the arrangements embodied in these designs, which are so clearly delineated as to easily explain themselves, and our readers can thus readily compare the relative merits of the two premiated architects' work in this competition.

## CHAMBERS MEMORIAL STATUE.

IN the month of March the Town Council of Edinburgh invited a number of the sculptors resident in Scotland to send in competitive models for a bronze statue 10ft. 6in. high, which is to be erected in Chambers-street, Edinburgh, in memory of the late Dr. Chambers, the well-known publisher, at one time Lord Provost of that city, and through whose munificence the interior of the old Cathedral of St. Giles was restored to its original condition. Only six sketches were submitted, and Mr. Thos. Brock, A.R.A., who was appointed assessor, in his report said: "I am sorry there was not a more general response by Scottish sculptors to your invitation for designs, but nevertheless can heartily congratulate you on having three such excellent sketches to select from. I have no hesitation in recommending for adoption the one bearing the motto 'Nothing Hazard Nothing Have' as being the most appropriate in general conception, and most effective in the views in which it will be seen when approached from either end of the street—a most important consideration. The design 'St. Columba' (which runs the first-named very closely in some respects) I place second, and 'Fiat Justitia' third in order of merit." On opening the envelopes it was found Mr. John Rhind, Cambridge-street, Edinburgh, was the author of the successful design, while his two sons, Mr. Wm. Birnie Rhind and Mr. J. Massey Rhind were the authors of the second and third placed designs, and receive the premiums of £50 and £25.

## A PRIEST'S STOLE (FROM ST. MICHAEL'S CHURCH, FOLKESTONE).

THIS stole was executed in the East Grinstead Sisters' School of Ecclesiastical Embroidery at St. Katherine's, 32, Queen-square, W.C. It was embroidered on cloth of gold in gold thread and silks of various colours, every part being finished up like miniature painting. The drawings are by Mr. Oswald Fleuss.

## CHIPS.

Two busts, which have just been added to the collection of memorials of distinguished Scotsmen in the hall of the Wallace Monument at Stirling, were publicly placed in position on Tuesday. They represent James Watt and Hugh Miller, and have been executed by Mr. D. W. Stevenson, R.S.A., of Edinburgh.

The Peterborough Co-operative Society on Friday entertained the workmen on the new buildings in Park-road, in that city, to a supper at a restaurant. About 70 sat down, and amongst those present were Mr. Hind, of Leicester, and Messrs. Wenlock and Co., the architect and builders.

The county justices of Lancashire have adopted plans by Mr. E. H. Dawson, of Lancaster, for workshops and other buildings about to be added to the county lunatic asylum near that town.



## WAYSIDE NOTES.

THE British Association meetings have been the topic of the past week, even for architects, as, although the *savants*, whose more or less interesting discourses attracted such vast crowds to pretty Bath, did not touch upon the art of architecture, pure and simple, they occasionally commented upon its more practical aspect. At times, however, it would seem that the existence of the science of archaeology was remembered. Last Monday, for instance, there was a considerable assemblage round the oval Roman bath, and a running lecture given on Romans and their baths generally. More than this, on the day following the inauguration of the meetings, Lieut.-General Pitt-Rivers spoke on the subject of the working of the Act for the Preservation of Ancient Monuments, with the carrying out of which he has been intrusted for the last five years. It appears that only one owner of ancient monuments scheduled under the Act of 1882 has voluntarily offered to make use of it. The list of monuments at present under the Act numbers thirty-six, all told, and includes the Pictish Tower at Moussa; Edin's Hall, the Black and White Catherthuns, the inscribed stones at Laggangairn, the circle on Eyam Moor, the "Nine Ladies" on Stanton Moor, the Pillars of Kirkmadrine, St. Ninian's Cave, Uleybury, in Gloucestershire; Kit's Coty House, near Maidstone; the stone circle at Stanton Drew, the tremulous chamber at Stoney Littleton, and the Pentze Evan, in Wales. If the reader can say that he has examined all the above, he may consider himself a small authority on the rude stone monuments of Great Britain. Excepting any visits to works and buildings near Bath, this lecture of General Pitt-Rivers must be considered to be the most architectural thing done at the British Association Congress of 1888.

Sir Frederick Bramwell's opening address was as brilliant and interesting as one naturally expected it would be, even if the subject matter was not altogether new. Any architect listening to the eulogy of the civil engineer must have felt "out of it," to employ a vulgar idiom. To still further murder the Queen's English, I would say that it is time to take a "back seat" when Sir Frederick dilates on the poetical side of the engineer's calling. "Might there not," asked the President, "be true poetry in the feelings of the engineer who solved a problem such as this? This rock, never visible above the surface of the tide, has been the cause of destruction to many a noble vessel which had completed, in safety, its thousands of leagues of journey, and was within a few score mile of port. On it build a lighthouse. Lay the foundations through the water, in the midst of the turmoil of the sea; appear to be attaining success, and find that the whole of the preliminary works are ruined or destroyed in one night. Again commence, and go on until the work rises above ordinary tide level; then upon these sure foundations erect a fair shaft, graceful as a palm and sturdy as an oak; surmount it with a light, itself the product of the highest application of science; direct that light by the built-up lens, again involving the highest application of science; apply mechanism, so arranged that the lighthouse shall from minute to minute reveal to the anxious mariner its exact name and its position on the coast. Is there no feeling of a poetical nature excited in the breast of the engineer who had successfully grappled with a problem such as this?" So spake Sir Frederick; and one would think that every C.E. in the land must, upon reading the address in his morning paper, have felt a warm glow of pride in his bosom; while the humble designer of churches and chapels may well have been quite overcome with mortification.

Joking apart, there is poetry in such an idea; but it would perhaps have been better if the President of the late British Association meetings had not spoken about it. It is not for us to complain, however. In the architectural profession there is far too much gabble about the poetical side of the business. At every opening of the various societies, at every slight pretext, we are telling one another what a glorious and poetical calling is that of the architect; and every youngster becomes blown out with the gas, till his master's office won't

hold him. (This is aside, however.) As regards the poetry of engineering, it is only a very small minority who ever appreciate the difficulties conquered; the many look upon every new achievement with passive indifference. Indeed, we have all of us ceased to wonder when we hear that vast undertakings are to be attempted or have been accomplished—that a lengthy canal is to be cut through every obstacle; that a tunnel is to be driven under a channel of the sea; or that a bridge of enormous span is to be thrown across an estuary. Who expressed wonder that M. Eiffel was about to erect a tower 300 metres in height? The news was received as a matter of course. Long familiarity has bred contempt, and the public mind is dulled to all sense of the credit due to those who have triumphed over immeasurable difficulties of construction.

The new Thames subway, I conclude, was the undertaking referred to by Sir Frederick Bramwell, as likely to be worked by electricity. At any rate, I trust it is so, as it is irritating to know that clumsy wire-rope traction was proposed to be employed for rolling stock in the latter days of the 19th century; an impression, moreover, being thus created in one's mind that the success of the Subway Company was to be subordinated to the success of the providers of the arrangements for the wire-rope traction.

The report of the Inspector-General in Bankruptcy, as affecting the building trades, is very disheartening—or may it be taken to be encouraging? "It is evident," says the report, "that there has been a large amount of speculative building, conducted chiefly upon borrowed money, and characterised in some cases by extreme recklessness. Buildings (chiefly dwelling-houses) have been erected without any real demand, and have either been realised at a loss or held in the face of a constant depreciation in value. Failure has been the inevitable result." All this we knew before. The report might well have stated that speculative building by impecunious "builders" was characterised, in the majority of cases, by extreme recklessness. Mr. Buggins's brazen-faced impudence is astonishing. Failures in the speculative building trade are not on the half-measure scale. Indeed, the whole system may be described as based upon the "neck or nothing" principle—bloated success or ruination. Under these circumstances one is not surprised to learn, from the above report, that in the case of one London builder, the liabilities were £56,000, and the assets *nil*; that in another case the liabilities amounted to no less than £657,000, and assets only £9,000; while yet in a third case the bankrupt was liable for nearly a quarter of a million, with, nominally, £7,000 assets, though, practically, as it turned out, only amounting to £617! It is a very great pity (to put it mildly) that the credit system should exist, in the building trade, to such a tremendous extent. The cash down principle would stop jerry-buildings to-morrow.

Mr. Waterhouse recently addressed a letter to the Right Hon. Lord Balfour of Burleigh on the subject of "jerry-building," suggesting that in the framing of the new Local Government Bill clauses should be inserted compelling rural district surveyors to pass the examination of either one of the three institutes—Architectural, Engineering, or Surveying. Lord Burleigh's reply to Mr. Waterhouse's letter was to the effect that the subject did not come within the scope of the Bill. In the last R.I.B.A. *Journal* there is, I believe, a note saying that the council consider that were such examinations to be made compulsory, jerry-buildings would cease to exist. Then why, in the name of Sir Christopher Wren, did the Institute throw in its weight against the late Architects' Registration Bill, which provided that building surveyors should, before appointment, have passed their own examination, or any other that might be selected?

I fear that I must have British Association on the brain; so the reader will pardon another reference to the Bath meetings. If Professor Oliver Lodge is correct in his surmises, we shall have to pull down all old copper lightning conductors, and reinstate with new of a different description. According to opinions

expressed in his paper read at Bath on the 11th inst., the best method of constructing a lightning conductor is by employing several stout wires of iron, and not of copper. Any shape should be given to the rod other than a bar of circular section; it should be flattened out as much as possible, if not in the form of separate, detached wires. It is some consolation to those to whom the re-modelling of their lightning rods would be a great expense, to know that so great an authority as Mr. W. H. Preece is not impressed with Professor Lodge's researches, but still clings to copper as the most suitable material for their construction. GOTH.

## CHIPS.

A parochial hall at Barton, Herefordshire, was opened on Thursday in last week. Elizabethan in style, it is built of local stone, and roofed with Broseley tiles. Mr. Shepherd, of Worcester, was the architect, and Mr. Hope, of Kingstone, the builder, and the total cost was £400.

The family and friends of the late W. L. Palmes, of Naburn Hall, near York, are about to place a memorial organ in Naburn Church. The chamber is now being prepared, and the contract is to be completed by the 1st of November. Mr. Hodgson Fowler, Durham, is the architect, and Messrs. Forster and Andrews, Hull, are the organ builders. The estimated cost is £400.

Mr. Thornhill Harrison, one of the Local Government Board inspectors, held an inquiry at Beckenham, Kent, on the 6th inst, into an application of the Beckenham local board to borrow the sum of £11,444 in respect of sewer depôts and street improvements in the board's district.

A new church is about to be built at Kenfig Hill, near Bridgend, from plans by Messrs. Halliday and Anderson, of Cardiff.

M. Delebecque, chief engineer of the Northern of France Railway, died on Friday from injuries sustained in a tramway accident.

A subscription portrait of the ex-Mayor of Chip-ping Norton (Alderman Wilkins, who served the office eight years) was publicly unveiled at the Town-hall on Friday evening. The portrait is by E. S. Harper, of Birmingham, and is full length, life-size. It will remain in the Council Chamber, together with a memorial brass by Messrs. Jones and Willis, also of Birmingham.

The quinquennial festival and the opening of the new recreation hall at the Royal Albert Asylum for Idiots and Imbeciles, Lancaster, will take place on Monday next, under the presidency of Lord Herschell. The new building, which has been erected from the designs of Messrs. Paley and Austin, combines a hall for the entertainments and a playroom for the use of girls and junior boys. It is to be called the "Wimmarleigh Recreation Hall."

The town council of Margate has adopted the centre of the Marine-parade as the site of the Jubilee clock tower, and the work of erection will be commenced on the 15th prox. Mr. Pearce is the contractor.

The opening services of Rehoboth Strict Baptist Chapel, Bishop-street, St. Paul's, Bristol, took place on Thursday, the 6th inst. The chapel has been erected at a cost of £400. The building is of red brick with Bath stone dressings, and covered with Bridgwater angular tiles. It will accommodate about 150 persons. The builders were Messrs. J. Curnook and Sons, of Clifton.

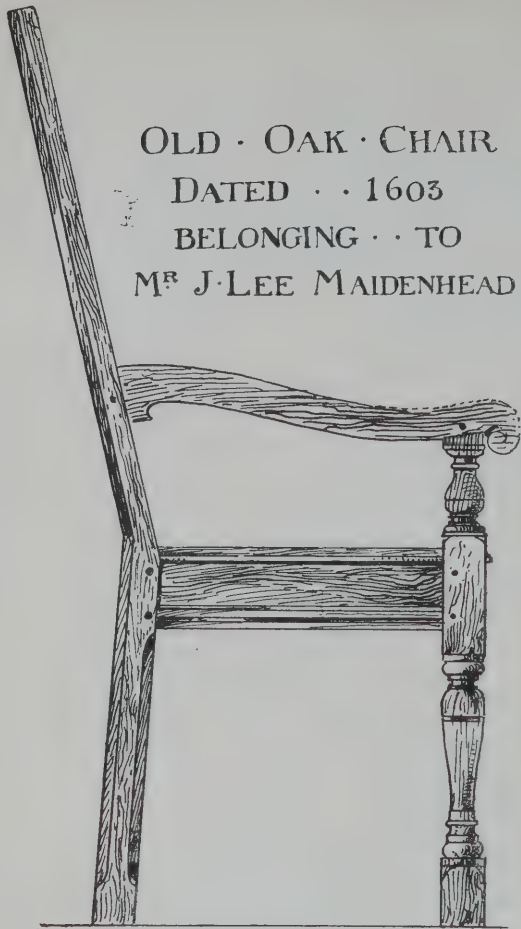
A memorial cross 8ft. in height, of Runcorn stone, decorated with floral ornament, has been placed in the Brooke burial-ground at Halton Cemetery, near Warrington, to the late Sir Richard Brooke, and an enriched cross, with ornamented border, has also been built in the wall of the Brooke Chantry of Halton Church. Depending from a sculptured architectural tree are the arms, properly emblazoned, and the label with family name. Below the latter are the Brooke motto and inscriptions. The works have been carried out by Messrs. Williams and Clay, of Warrington, from the designs of Messrs. Douglas and Fordham, of Chester.

Considerable alterations have recently been carried out at No. 4, Moira-place, Above Bar, Southampton, for the Birmingham and Coventry Cycle Company, consequent on their shop at Marsland-place having become unsafe, owing to the subsidence of the foundations. The new premises have a frontage of 55ft. The alterations have been carried out by Messrs. John Crook and Sons, of Southampton, from the plans, and under the supervision of, Mr. E. W. Evans, M.S.A., of 16, Port land-street, Southampton.

A new Roman Catholic church is about to be built in Guildhall-street, Folkestone, from plans prepared by Mr. Leonard Stokes, of London.



OLD · OAK · CHAIR  
DATED · · 1603  
BELONGING · · TO  
MR J·LEE MAIDENHEAD



SIDE · VIEW

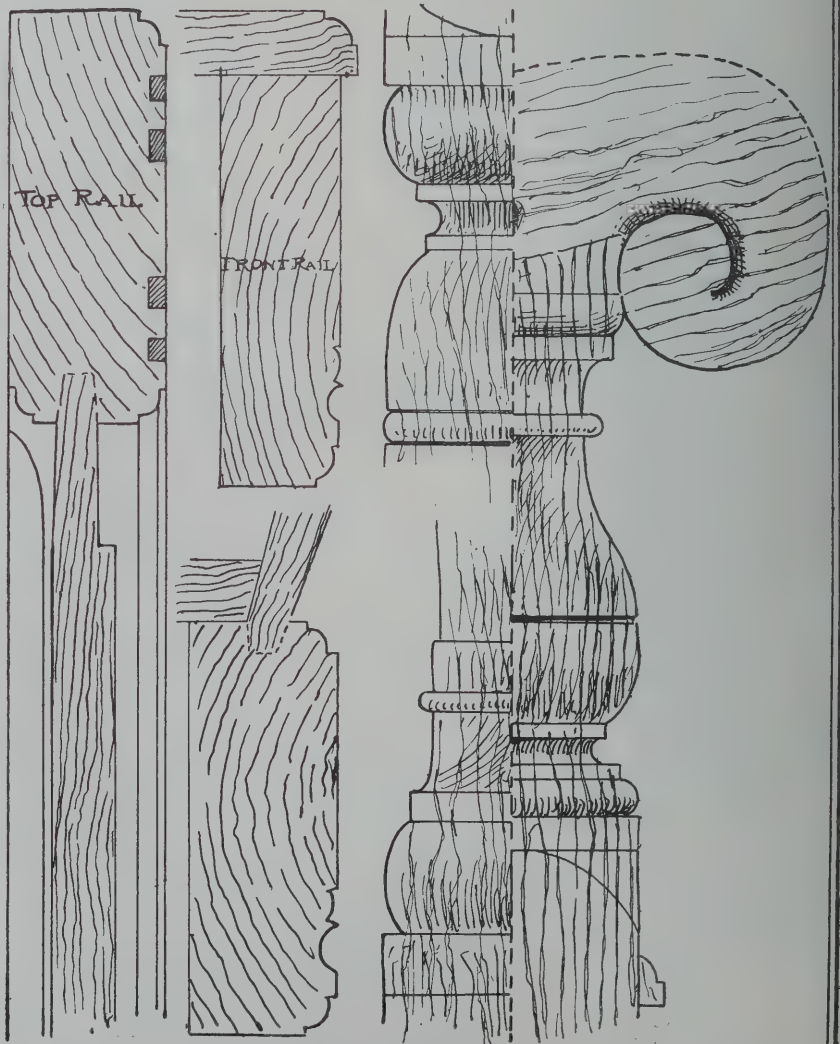


FRONT · VIEW



TOP RAIL

FRONT RAIL



DETAILS · OF · BACK · ARM · RAILS

DRAWN BY W. PEART

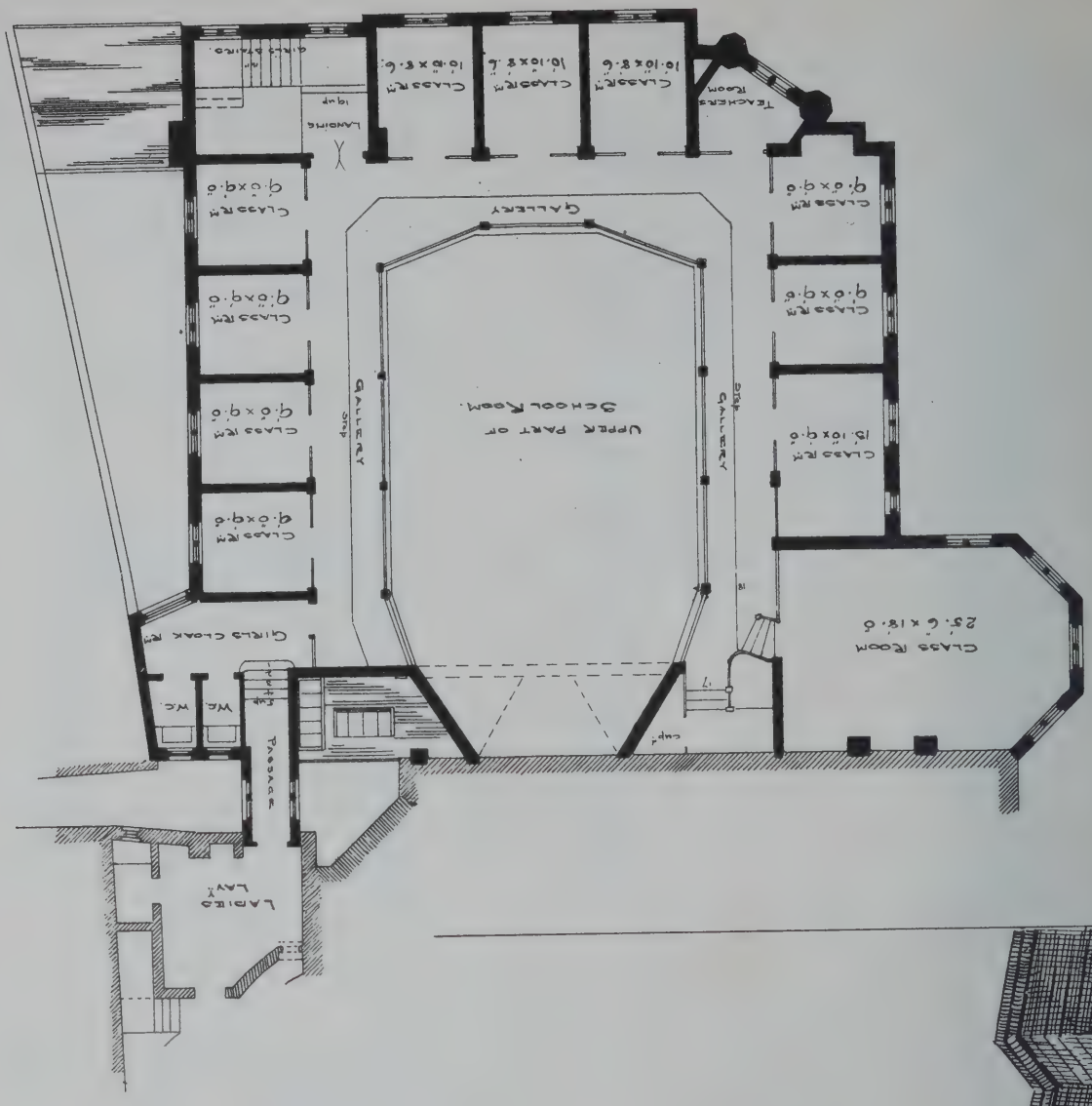
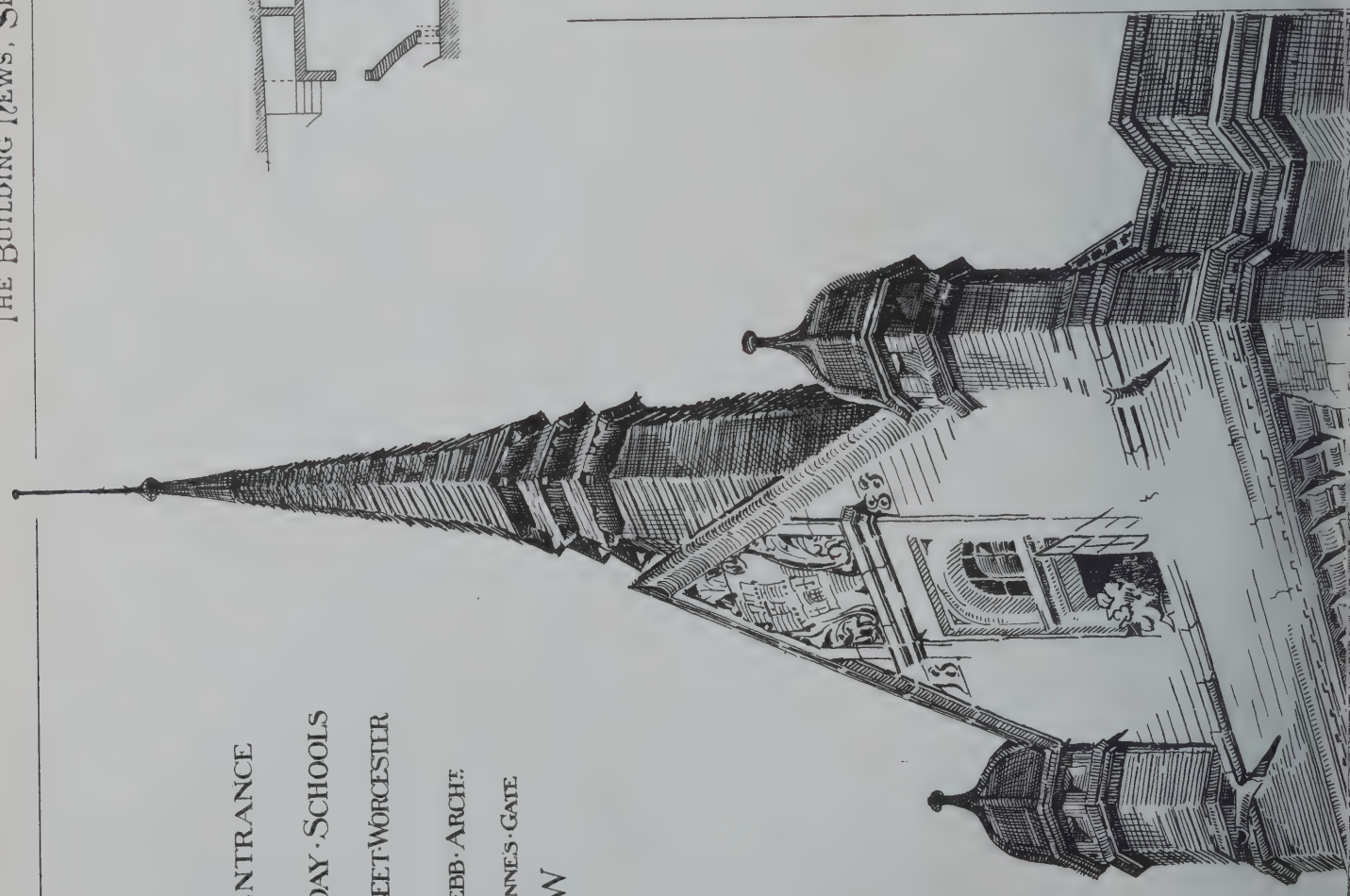






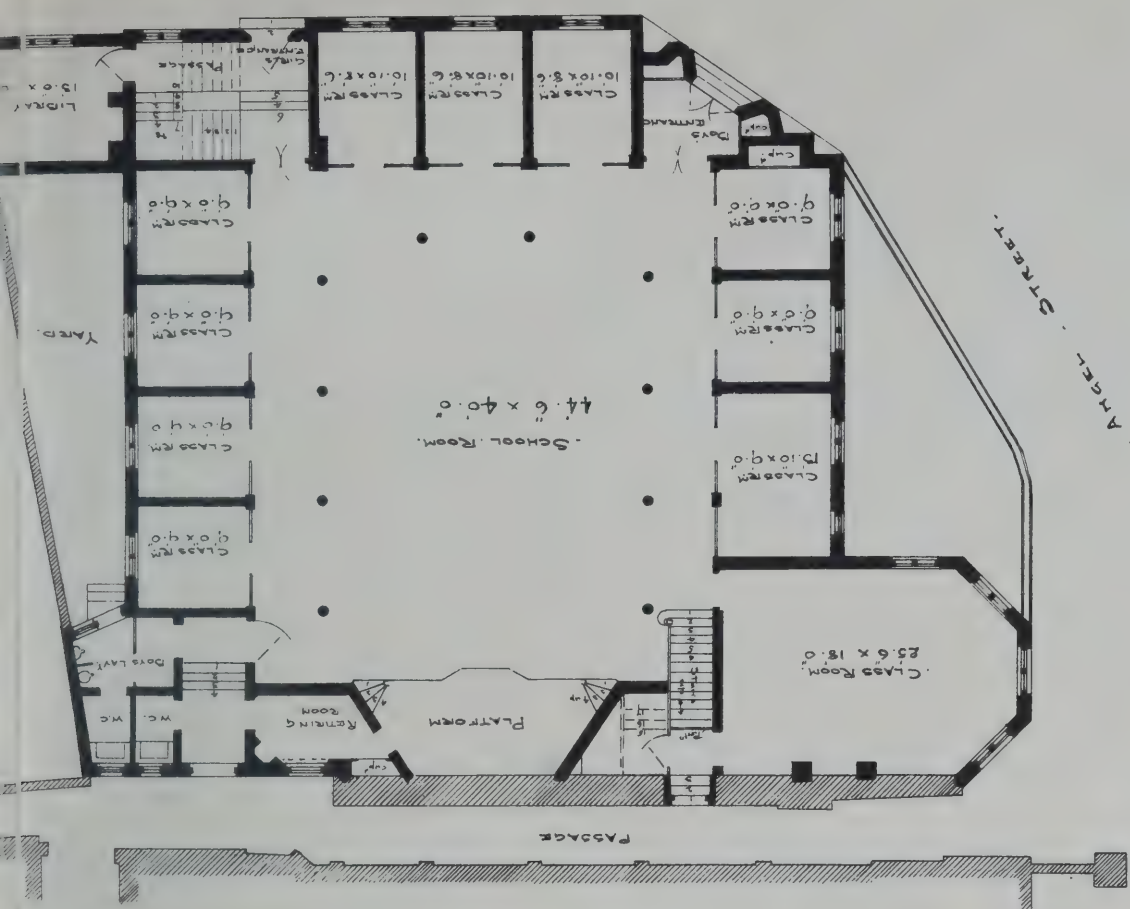
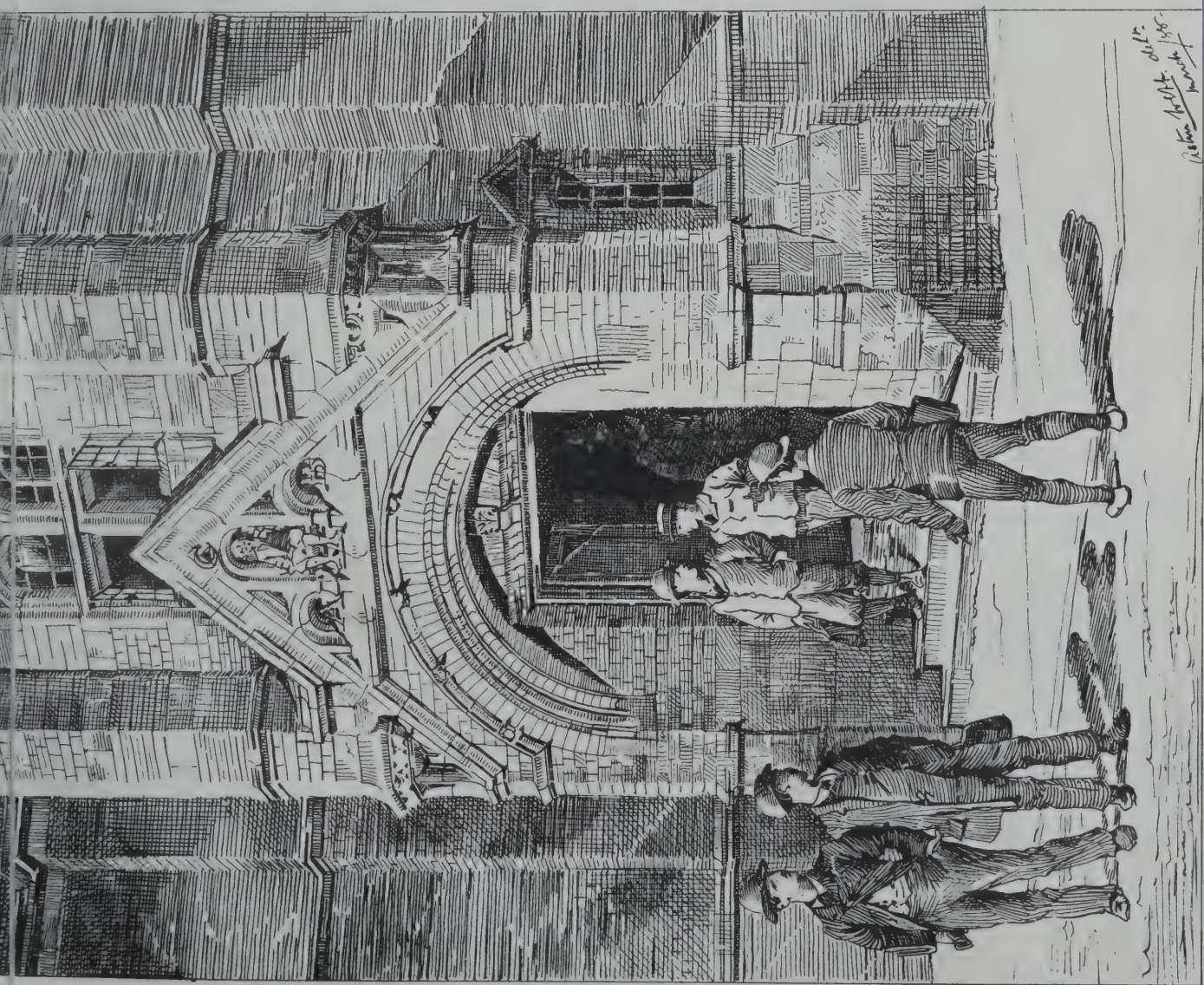
BOYS · ENTRANCE  
NEW · SUNDAY · SCHOOLS  
ANGEL · STREET · WORCESTER

ASTON · WEBB · ARCHT.  
19 QUEEN · ANNE'S · GATE  
S.W.



— FIRST FLOOR PLAN —





— GROUND PLAN —

Scale 1/4" = 1' of feet.









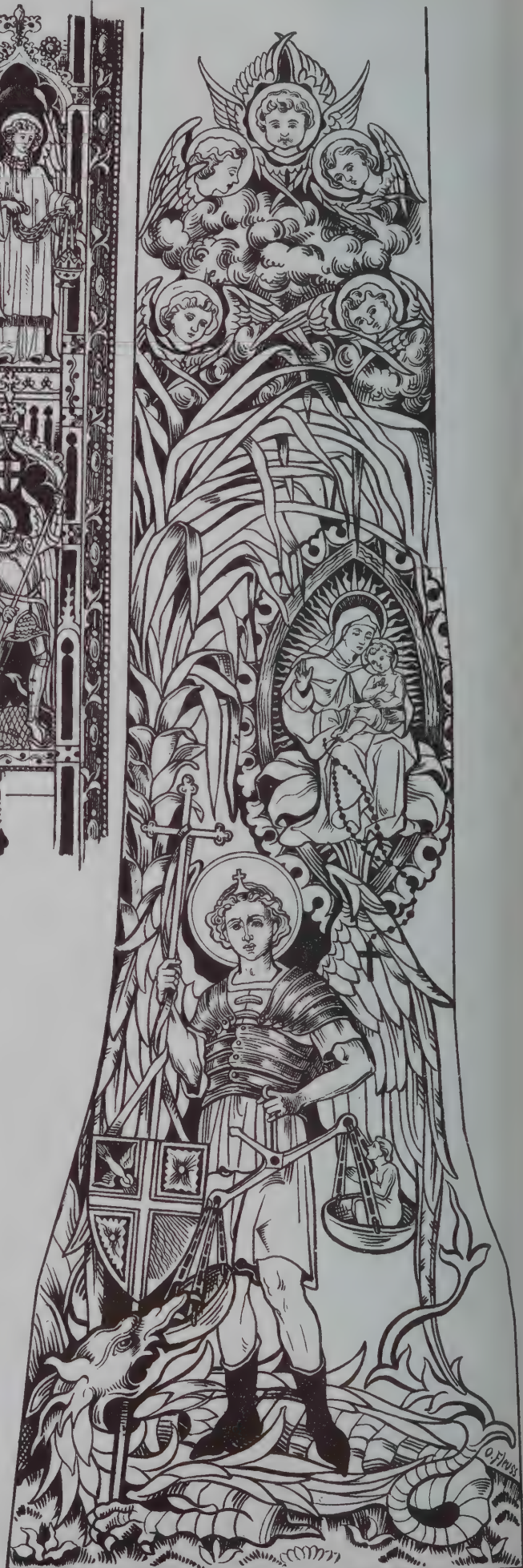
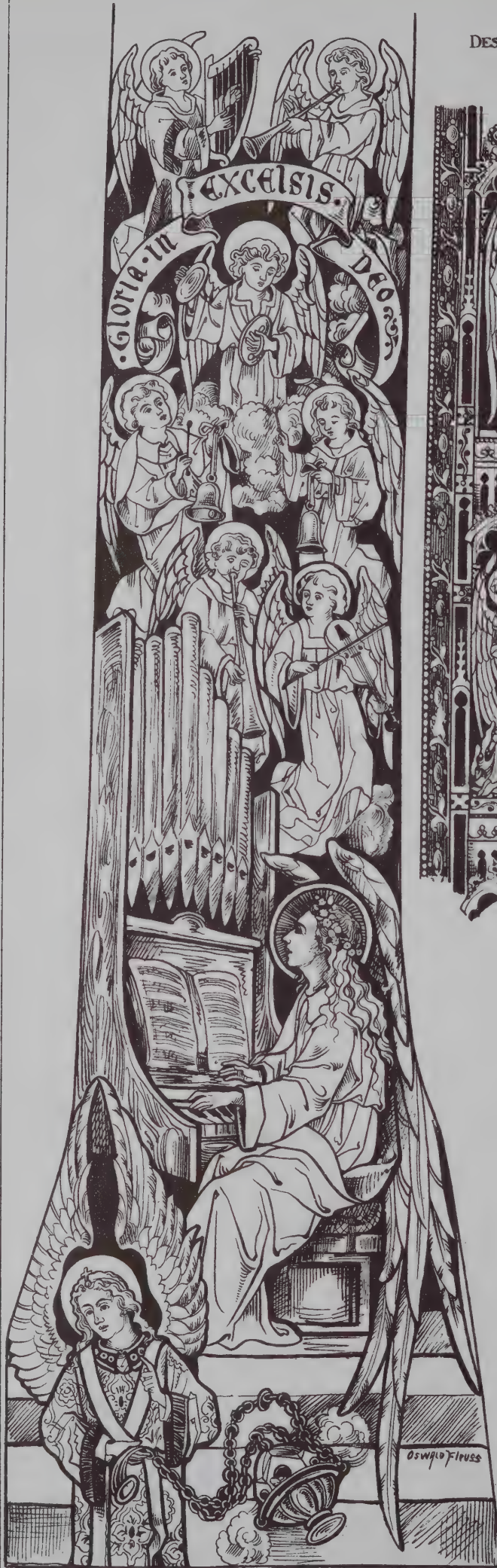


ST. MICHAEL'S CHURCH · FOLKESTONE

A · PRIEST'S · STOLE

DESIGNED · BY · MISS · AUDREY · RIDSDALE · SWAFFHAM · VICARAGE

EXECUTED · BY · THE · ECCLESIASTICAL · ART · SCHOOL  
32 QUEENS SQUARE · W.C













SEP. 14. 1888.



ARY, ROME.

"PHOTO-TINT" by James Akerman 6, Queen Square, London, W.C.











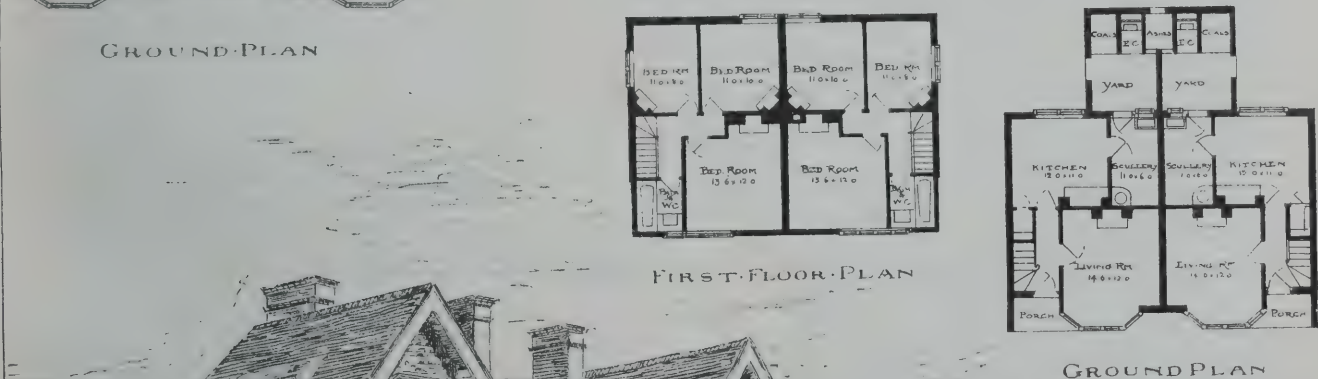
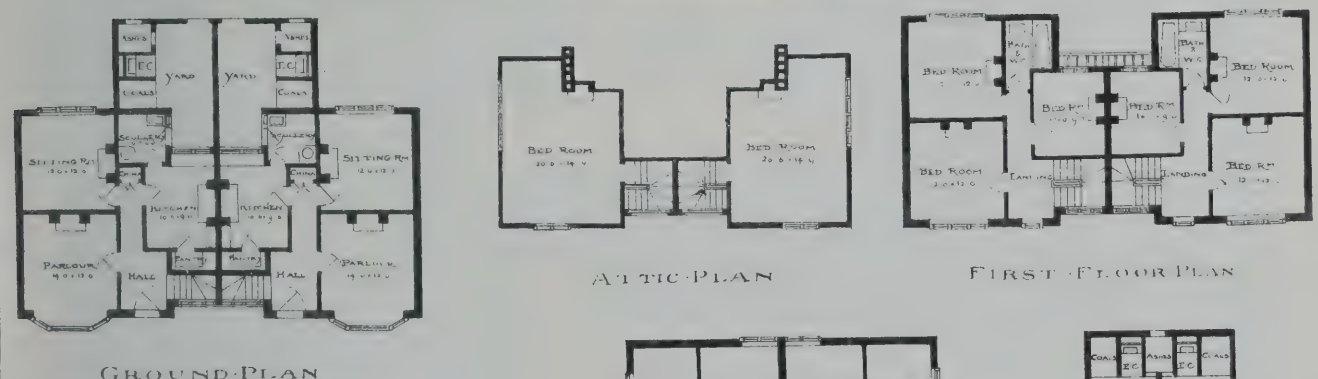


Photo lithographed & Printed by James Akerman, 5, Queen Square, W.C.





THIRD CLASS DWELLINGS.



FIRST AND SECOND CLASS DWELLINGS.









"PHOTO-TINT" by James Akerman, 6, Queen Square, London W.C.

CHAMBERS · MEMORIAL · EDINBURGH · JOHN · RHIND · SCULPTOR

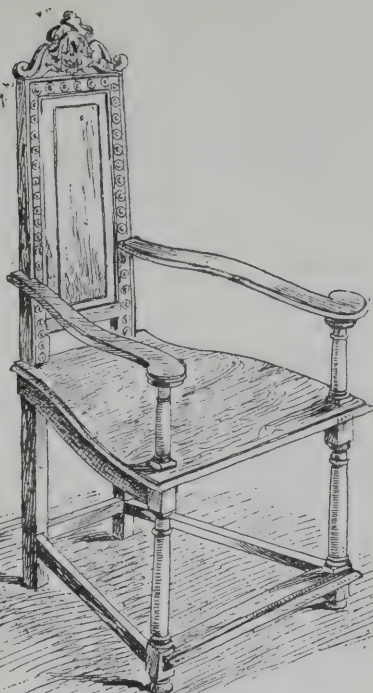








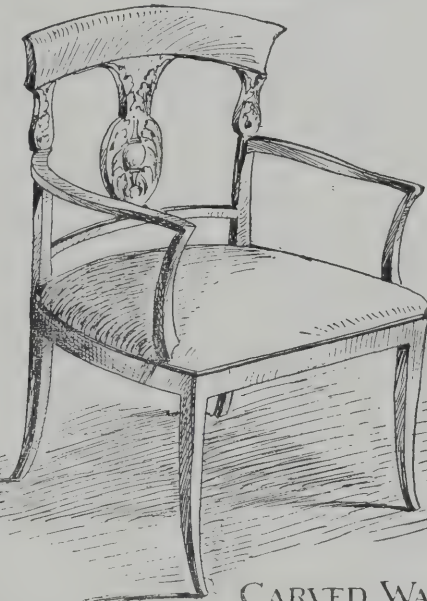
WHITE & GOLD  
SHERATON CHAIR



CARVED OAK CHAIR

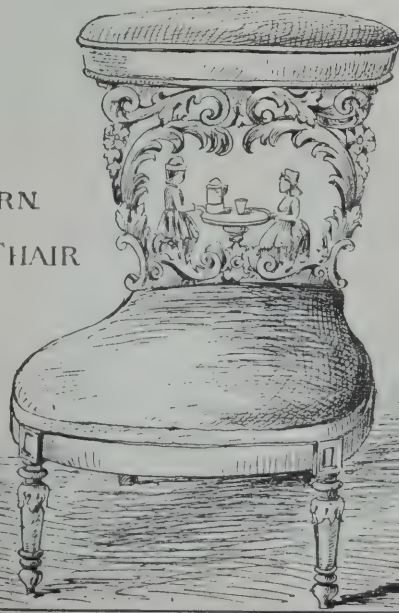


A CENTURY GUILD  
CHAIR

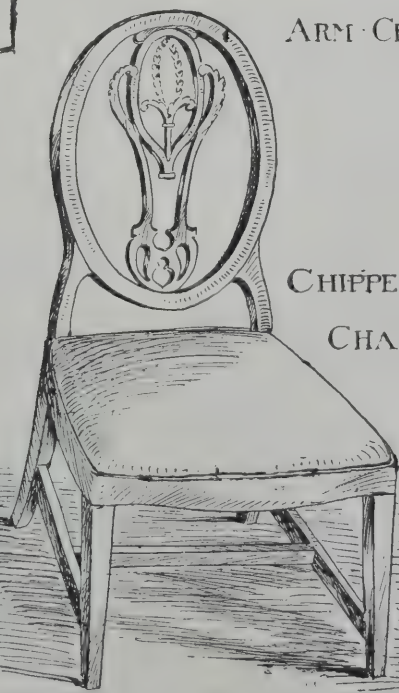


CARVED WALNUT  
ARM CHAIR

SKETCHES OF  
A FEW CHAIRS



MODERN  
OAK CHAIR



CHIPPENDALE  
CHAIR



PRACTICAL ARCHITECTURE WITH  
DETAILED ESTIMATES.—X.By HENRY LOVEGROVE, F.S.I., Surveyor.  
STAIRS.

## Basement to ground floor.

ft. in.	ft. in.	
4 0	5 8	1½ yellow deal treads with rounded nosings and lin. risers, tongued together, glued, blocked, and bracketed on and including strong fir carriages.
1 5		
14 3 6	69 5	Add.
1 5		
3 9	13 2	1½ do. winders, cross tongued, measured net.
3 6		
3 6	1 6	lin. Risers for do.
2 4 0		
5	3 4	Add.
3 6		1½ rounded nosing, tongued on floor as top tread.
5	1 6	lin. risers as before.
2		Ends risers only housed to strings.
	27	Ends treads with rounded nosings and risers housed to strings.
	3	Large ends, winders, and risers do.
	1	Extra to bull-nosed ends to bottom tread and risers.
	6	Notchings.
23 0		1½ yellow deal, moulded and framed, wall string.
2		Extra to long ramps in do., including joints.
15 0		1½ yellow deal, moulded and beaded, close outer string, part in short lengths.
10 6		Lab., rounded nosing on 1½ deal floor.
10 6	10 6	¾ in. deal, wrought and beaded upon lining.
1 0		
4 6		4 by 4 wrought and framed newels.
9 6		
15 3		1 Ornamental wrought and cut top to do.
	1	End stubbed to deal floor.
		Honduras mahogany moulded handrail out of 4 by 3½ framed and F.P.
26 3 0	78 0	1½ by 1½ deal bar baluster one end framed to deal, the other to mahogany.
	26	Turnings to balusters 2ft. long.

## STAIRS FROM GROUND FLOOR TO SECOND FLOOR.

ft. in.	ft. in.	
4 0	5 8	1½ deal treads, with moulded nosings and lin. risers, tongued, glued, blocked, and bracketed on, and including strong fir carriages.
1 5		
37 3 6		Add.
1 5		
4 3 6	49 0	1½ yellow batten cross-tongued landings and strong fir-framed boards.
3 6		
7 3 6	24 6	1½ deal wrought and moulded nosings tongued on.
4 0		Deal wrought, rebated, moulded 1½ by ¾ planted on under nosing of tread.
44 3 6	154 0	1 Piece of do. circular on plan to bull-nosed end of bottom tread.
		14 Ends risers only housed to strings.
	75	Ends treads with moulded nosing and risers do.
	75	Ends 1½ by ¾ moulded housed to strings.
	1	Extra to veneered, bull-nosed, and to bottom tread and riser with moulded nosing.
43 0	18	Notchings.
		1½ deal, wrought, framed, and moulded wall string.
9		Ex. to ramps in do.
13		Heading joints, cross tongued with skirting.
8 3 7	28 8	1½ deal skirting to match wall string.
4		Tongued and mitred angles to do.
43 0		1½ deal, wrought close outer string, part in short lengths.
39 0		Deal wrought and rebated for string and moulded capping, 3½ by 1½ to outer string.
4 0		Do. in S. L.
18		Ends housed on splay to newels.
39 0		Deal mouldings 1½ in. by 1 in., planted on face of string.
1		Ex. to ramp in last.
13		Ends housed on splay to newels.
4 0		Deal mouldings 1½ by ¾, tongued on.
4 0		1½ Deal wrought and moulded nosing, tongued on floor.
4 0		1½ by 1 Deal moulded, planted on.
5 1		End housed
17 6		4 by 4 wrought and framed newels.
40 5		Add.
8		Add (on upper landings).
2		Ornamental cut tops to newels as before.
		Turned pendants to do. 14 in. long.
39 0		N.B. — Continuation of newels on ground floor, taken with framings.
		Honduras mahogany handrail as before and F.P.
4 9		Add on landing.
8 1 3	8 9	Add in S.L.
	1	End handrail cut and wedged.

80	ft. in.	ft. in.	
	3 0	240 0	2 in. deal square bar balusters one end framed to deal, the other to mahogany.
80			Turnings to do. 2ft. long.

## FRAMINGS AND SPANDRELS ON GROUND FLOOR.

ft. in.	ft. in.	
11 7		5 by 4½ fir wrought framed rebated post.
11 7		Plugging to wall.
1		End stubbed to floor.
11 7		4½ by 4½ fir wrought framed and rebated post grooved for 2 in. framing.
2 7 6	15 0	End stubbed.
		4 by 4 wrought framed posts twice grooved for 2 in. framing.
2		Ends stubbed.
4 0		8 by 4½ fir wrought framed and rebated head.
4 0		9 by 4½ fir wrought framed and double rebated transom.
3 5		Deal moulding out of 4 by 3 planted on.
2		Mitred and returned moulded ends to do.
3 1		Labour to chamfer.
2 5 10	11 8	Labour stopped chamfer to deal frame.
2		Mitres.
2		Splayed stops.
3 0		2 in. deal door, the lower part in two panels moulded both sides, the upper sashed with wide moulded bars in small squares with diminished stiles.
6 10	20 6	
		Pair 4 in. butts.
1		6 in. brass mortise lock, with black furniture o.s., and brass the other.
2		Sets long and short finger plates.
1 1 1	4 11	Lead quarry glazing, 2s. per foot glazed.
6 3 8	22 0	Deal beads, mitred, with brass screws and cap.
3 0		
3 6	10 6	2 in. deal ovals, moulded sash, fixed.
9 10		
1 0	7 6	Glazing as last.
9 3 8	33 0	Beads as last.
10 0	13 0	Labour chamfer.
2		Mitres.
5 2		2 in. deal framing, moulded both sides, 2 panels high.
7 6	38 9	
8		Add, but 8 in. wide.
4 7 6	30 0	Labour, fittings, and housing, 2 in. deal framing into groove of posts.
½ 5 2		2 in. deal mouldings spandrel-shaped sash, measured net.
3 6	9 0	
6 10	5 0	
1 0		
7	4	
3		
3	1	Glazing as last.
10	8	
9		
5	2	
4	2	
10		
1 0	10	
6 3 8	22 0	
1 8		
2 3 0	6 0	Deal beads as before.
2		
3 6		Labour fittings and housing 2 in. sash, into grooves in posts,
½ 8 9		2 in. deal moulded and square spandrel framing measured net.
6 6		Labour fitting and housing do. to posts.

## STAIRS AND FRAMINGS UNDER, &amp;C.

lin.	tongued risers.	
4 10		
1 6		
10 3		
16 7		
1½ in. treads with rounded nosings and lin. risers tongued together, glued, blocked, and bracketed on and including strong fir carriages.		
75 1 1½ in. do., but in moulded nosings and do.		
135 2		Do. winders cross-tongued moulded net.
13 2		
¾ in. wrought and beaded apron lining.		
10 6 1½ in. wrought and cross-tongued landing and strong fir bearers.		
49 0		
Yellow deal.		
2 in. door with diminished stiles, the lower part in two panels moulded both sides, the upper part sashed in small squares with wide moulded bars.		
20 6 2 in. ovolo fixed sash.		
10 6 Do., but spandrel shaped measured net.		
8 0		
2 in. moulded both sides framing two panels high.		
38 9 Do., but only 8 in. wide.		
5 0 2 in. moulded and square spandrel framing measured net.		
28 9		

Labour fitting and housing 2 in. framing to groove in posts.		
30 0		Plugging to wall.
3 6	11 7	1½ in. wrought and moulded nosing tongued to floor.
6 6		
37 0	24 6	
	4 0	
Mitred beads for glass with brass screws and cups pt. sd.		
22 0		Labour chamfer.
46 0	3 1	Mounds.
34 4	10 0	
102 4	2	
Labour stopped chamfer.		
11 8		Splayed stops.
2		Labour rounded nosing on 1½ in.
10 6		
1½ in. rounded nosing tongued on floor.		
3 6 1½ in. by 1½ in. bar balusters, one end framed to deal, the other to mahogany.		
78 0		Turnings to do. 2ft. long.
26		2 in. bar balusters, one end framed to deal, the other to mahogany.
240 0		Turnings to do. 2ft. long.
80		
1½ moulded and framed wall skirting.		
23 0		Extra to ramps.
43 0 9		Do. to long do.
		Heading joints to skirting cross tongued.
13		4 in. by 4 in. wrought and framed newels
14 0		Ornamental cut tops to do. as sunk.
40 5		
1		Do. pendants 14 in. long.
8 2		
1½ deal skirting to match wall skirting.		
28 8		T. and M. angles.
4 1½		close framed outer skirting.
		Part in sl.
43 0		Do. moulded.
15 0		
4 by 4 wrought framed posts, twice grooved for 2 in. framing.		
15 0		4½ in. by 4½ in. wrought, framed, rebated, and grooved post.
11 7		5 in. by 4½ in. wrought, framed, and rebated post.
11 7		
8 by 4½ wrought, framed, and rebated head.		
4 0		5 in. by 4½ in. wrought, framed, and double rebated transom.
4 0		
YELLOW DEAL.		
Wrought, rebated moulding, 1½ by ¾, tongued on under treads.		
158 0		Piece cir. on plan to bull-nosed end of tread, q.s.
4 0		
1		Ends framed to strings.
75		Moulding 1½ in. by 1 in., planted on string
39 0		Ends housed on splay.
4 0		
13		Deal moulding out of 4 in. by 1 in. planted on.
3 5		Mitred and rebated ends to do.
2		
Rebated and moulded capping to outer string, 3½ by 1½.		
39 0		Do. sl.
4 0		Ends housed on splay.
13		Notchings.
4		
6		
18		Ends, newels, &c., stubbed to floor
1		
1		
1		
2		
Ends risers only housed to strings.		
2		Treads in rounded nosing, do. risers.
14		
27		Do. with moulding do. do.
75		Large ends, winders, with round nosings and risers do.
3		Ex. to bull-nosed end to bottom tread with round nosing and riser.
1		Do. veneered do., with moulded nosing and do.
1		
Honduras mahogany framed and moulded handrail, out of 4 in. by 3½ in. French polished.		
15 3		Do. in sl.
43 9	3 9	End c. and wedged in brick wall, and plastering in 9 to.
1		
Ironmongery of best description, rivets, screws, and fixing		
Pair 4 in. wrought-iron butts.		
1 6		Brass mortise lock and fur, black one side and gold the other.
1		Sets finger-plates to match.
2		
STAIRS AND FRAMINGS UNDER TO FORM SERVY, &C.		
Best yellow deal, picked free from all defects: —		
Ft.		
11		Supl. ¾ in. wrought and beaded apron lining...
17		lin. do. tongued risers .....
49		1½ in. do. and cross-tongued landing on .....
		and including strong fir bearers .....
75		1½ in. do. treads with rounded nosings .....
		and lin. risers tongued, glued, blocked, and bracketed on, and including .....
		strong fir carriages .....
135		Do. do. with moulded nosings and .....
		do. and do. ....
13		Do. winders with rounded nosings cross .....
		tongued measured net .....



2	2in. door with diminished stiles, the lower part in two panels moulded both sides, the upper part sashed in small squares with stout moulded bars .....	£ s. d.
2	2in. moulded and square-panelled framing spandrel, measured net .....	
2	Do. Moulded both sides framing two panels high .....	
2	Do. do. do. but 8in. wide .....	
2	2in. ovolo sash fixed .....	
2	Do. do. spandrel-shaped, measured net .....	
Run.	Labour chamfer .....	
	No. 4 mitres .....	
	Do. stopped chamfer .....	
	No. 2 splayed steps .....	
	Do. rounded nosing on 1½in. .....	
	Do. fitting and housing 2in. framing to grooved posts .....	
	Plugging to wall .....	
	Beads mitred around glass and fixed with brass cups and screws in short lengths .....	
	1½in. rounded nosing tongued to floor ..	
	Do. moulded do. do. .....	
	1½in. by 1½in. bar balusters framed to deal and mahogany .....	
2	2in. by 2in. do. do. .....	
	No. 26 turnings 2ft. long to 1½in. by 1½in.	
	No. 80 do. do. to 2in. by 2in. .....	
	1½in. framed and moulded wall string ...	
	No. 9 extra to ramps in do. ....	
	2 do. long do. ....	
	13 cross-tongued heading joints with skirting .....	
	1½in. moulded skirting to match wall string .....	
	No. 4 tongued and mitred angles .....	
	1½in. close-framed outer string, part in short lengths .....	
	Do. moulded and framed do. ....	
	4in. by 4in. wrought and framed newels	
	No. 9 ornamental cut tops to do. ....	
	2 do. pendants 14in. long .....	
	4in. by 4in. wrought and framed posts twice grooved for 2in. framing .....	
2	4½in. by 4½in. do. but rebated and grooved .....	
2	5in. by 4½in. do. but rebated .....	
1	8in. by 4½in. do. do. ....	
1	9in. by 4½in. do. transom double rebated .....	
2	Wrought and rebated moulding 1½in. by ½in. tongued on under treads .....	
	No. 75 ends housed .....	
	No. 1 piece of do. circular on plan to bull-nosed tread .....	
3	Moulding 1½in. by 1in. planted on outer string .....	
	No. 14 ends housed on splay .....	
0	Rebated and moulded capping to outer string, 3½in. by 1½in. ....	
4	Do. do. in short lengths .....	
4	No. 13, ends housed on splay .....	
	Moulding out of 4in. by 3in., planted on transom .....	
	No. 2, mitred .....	
No. 24	Notchings .....	
	5 Ends, posts, &c., stubbed to floor .....	
	16 Ends risers housed to strings .....	
27	Do. treads with rounded nosings and risers do. ....	
75	Do. do. with moulded nosings and do. ....	
3	Large ends of winders with rounded nosings and do. ....	
1	Extra to bull-nosed end to bottom tread, with rounded nosing and riser .....	
1	Do. to veneered do., with moulded nosing and do. ....	
9 Run.	Honduras mahogany, framed and moulded handrail, out of 4in. by 3½in., and French polishing .....	
4	Do., but in short lengths .....	
	No. 1 end cut and wedged in brick wall, and plastering made good .....	
Ironmongery of the best description, including screws and fixing:—		
No. 1	Pair 4in. wrought iron butts .....	
1	6in. brass mortise lock, with brass furniture one side and black the other .....	
2	Sets black chins, long and short finger-plates .....	

Carried to summary ...

STRAINS.—VI.\*

By G. A. T. MIDDLETON,

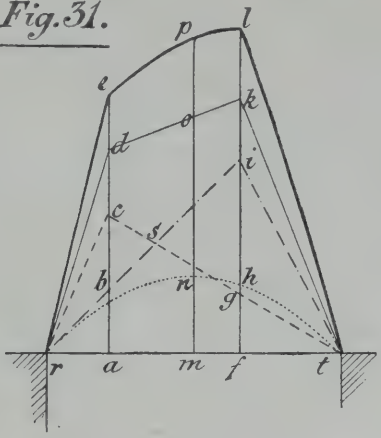
FLANGE STRAINS (continued).

WHEN, as often happens, a beam has to carry several loads at different points, the strains due to each have to be ascertained separately, and then combined at all points before a girder can be designed to resist them. To do this arithmetically, by ascertaining the strains at several given points from each load in succession, and adding these strains together to ascertain the total strain at each of these points, is tedious in the extreme. Geometrically considered, the problem is an easy one.

In Fig. 31, an outline of short dashes (*rc t*) represents the strain outline due to one fixed load, the dot-and-stroke outline *rit* represents the strain outline due to another fixed load, and the dotted outline *rn t* represents the strain outline due to a distributed load, such as the weight of the girder itself. Of the triangles

*ret* and *rit*, the portion *rst* is common to both—which means that the strains which it represents occur twice over, and that the figure *rcsit* plus the figure *rst* represents the strains

Fig. 31.



due to the two fixed loads. The triangle *rst* has therefore to be combined with the figure *rcsit* to represent these strains in one figure. This can be done by making *cd* equal to *ab*, *ik* equal to *fg*, and by joining *rdkt*. The figure *rdktisr* can now be readily proved by the theory of triangles on equal bases, and with equal altitudes, to be equal to the triangle *rst*. In other words, the figure *rdkt* represents the total strains due to the two loads.

The strain outline *rbnht*, due to the distributed load, can similarly be added to this combined diagram by making *de* equal to *ab*, *op* equal to *mn*, and *kl* equal to *fh*, and by joining *replt* in the firm curved outline shown, which outline represents the total strains at all points due to the two fixed loads and the distributed load.

In all cases yet investigated, it has been assumed that the girders merely rest upon the supports without being fixed in any way. When the ends of girders are fixed, they are placed under an entirely new set of conditions; but it is so difficult to absolutely fix them over single spans that they are almost invariably assumed to be supported only even when held in position by bolts or by a superincumbent weight. When, however, girders are so built as to form one continuous structure over several spans, the portion over each central span becomes absolutely fixed at its ends.

In Fig. 32 an example is given of a girder

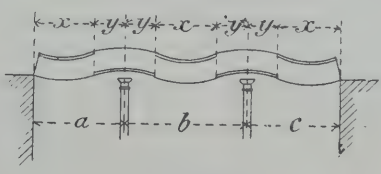


Fig. 32.

which is continuous over three spans, *a*, *b*, and *c*. Of these spans the portions *xx* are girders with the top flange in compression and the bottom in tension; while the portions *yyy* are cantilevers with the top flange in tension and the bottom in compression. The strains on *x* are found as usual for girders, with a span equal to *x*. One of the abutments of *x* is the end of *y*, which carries its proportion of the load on *x* as an end load besides any load to which it may itself be subject, the strains being ascertained in the usual manner for cantilevers. The greatest strain will, under almost all conditions, be found to be over the intermediate supports, while there will be no strain at the points where the ends of *x* rest on the end of *y* (which points are called "points of contraflexure").

It has been by the careful adoption of this principle of continuous girders that such immense bridges as that over the Forth at Inchgarvie have been rendered possible.

It is possible to arrive at the strains in the flanges of supported (i.e., not fixed) girders at all points in an exceedingly simple manner by

means of a reciprocal polar diagram, somewhat similar in principle to that shown in Fig. 6. Taking the simplest case—that of a cantilever with an end load—and assuming this load *W* to be equal to 8 tons, acting vertically downwards, set this 8 tons to a scale of weights vertically downwards from a point *a*. (See Fig. 33.) From *a* set off *ao* horizontally, equal

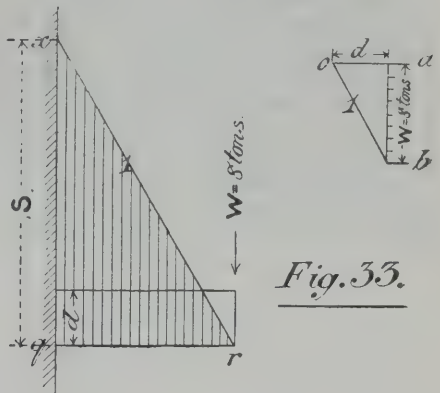


Fig. 33.

to *d*, the depth of the cantilever, and join *ob*. From *r*, a point in the bottom flange of the cantilever under the load, draw *rx* parallel to *ob* on the diagram. Ordinates from *qr* to *rx* will give the value of the strains in the flanges at any point.

The proof of this is simple, for the triangles *xqr*, *ba o* are similar to one another, and, therefore—

$$\begin{aligned} & xq : qr :: ba : ao \\ \text{or—} & xq \times ao = ba \times qr \\ \text{or—} & xq = \frac{ba \times qr}{ao} = \frac{Wl}{d} \end{aligned}$$

proving that *xq* = *S* according to the recognised formula. Moreover, the triangle *xqr* thus obtained is identical with the triangle *xqr* as ascertained in Fig. 16.

In a simple case like the foregoing the advantages of this method are not very conspicuous; but more complicated cases are much simplified by its adoption. Suppose, for example, that the cantilever carries two fixed loads of 3 and 7 tons respectively at different points (see Fig. 34), acting vertically down-

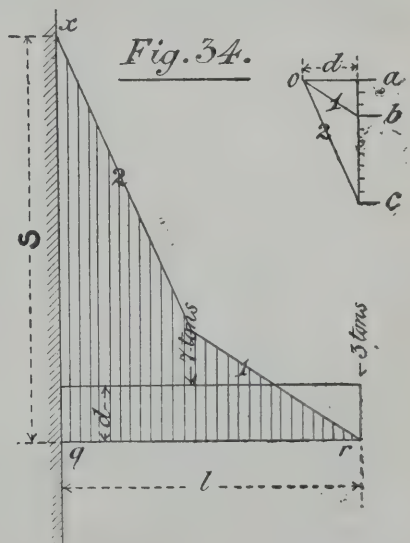


Fig. 34.

wards. According to a scale of weights set vertically down from a point *a*, the distance *ab* equal to 3 tons, and from *b* set down *bc*, equal to 7 tons. From *a* set off *ao* horizontally equal to *d*, the depth of the cantilever. Join *ob* and *oc*.

From the point *r*, vertically under the load of three tons, and in the bottom flange of the cantilever, draw *rp* parallel to *ob*, until a vertical line through the centre of gravity of the load of seven tons is reached in the point *p*; and from *p* draw *p2* parallel to *oc*. Ordinates drawn from *qr* to the outline *xpr* will give, to the scale of weights employed in the

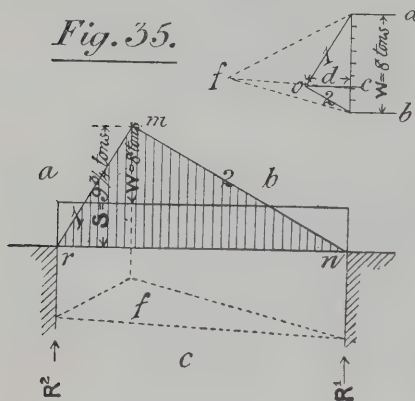
\* All rights reserved.



diagram, the value of the strains in the flanges at all points; and a little consideration will show that the figure  $xqrp$  merely contains the sum of the triangles which would have been obtained had each of the weights been considered separately. Cases in which three or four, or any greater number of loads have to be considered, can be treated in a precisely similar manner, until, by considering a distributed load to be an aggregate of an infinite number of infinitesimal loads, an outline similar to that shown in Fig. 20, can be arrived at. In order to obtain an accurate result, however, in this, as in all other systems in which diagrams are employed, the most absolutely perfect draughtsmanship is essential. In important calculations it is, therefore, desirable to employ a large scale and a fine line, so as to reduce the risk of errors to a minimum.

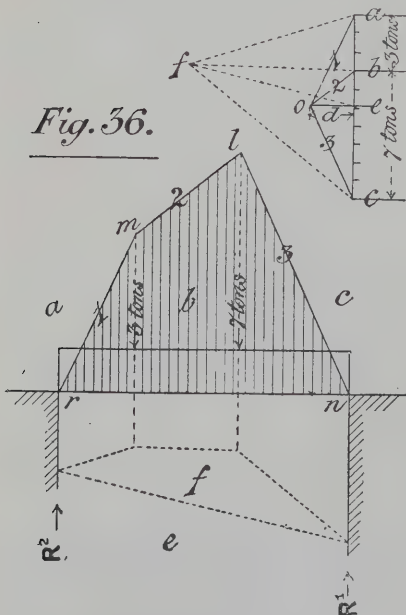
A simple application of this system to a supported girder can now be taken, in which a weight of eight tons acts vertically downwards

Fig. 35.



at some fixed point. (See Fig. 35.) From a point  $a$  set  $ab$  vertically downwards equal to eight tons to any scale of weights. From  $b$  set  $bc$  vertically upwards, equal to the same scale,  $R_1$ , the reaction of the right-hand abutment. Then  $ca$  will be equal to  $R_2$ , the reaction of the other abutment; these reactions being ascertained by the dotted polar diagrams, as explained in connection with Fig. 6. From  $c$  set  $co$  horizontally equal to  $d$ , the depth of the girder. Join  $oa$  and  $ob$ . From  $r$ , the point in which the bottom flange of the girder meets the left-hand abutment, draw  $rm$  parallel to  $oa$ , and from  $n$  draw  $nm$  parallel to  $ob$ . If accurately drawn,  $rm$  and  $nm$  will meet in  $m$ ,

Fig. 36.



vertically over the centre of gravity of the weight  $W$ ; and ordinates drawn from  $rn$  to the outline  $rmn$  will give the value of the strains in either flange at any point to the same scale of weights as that employed in setting down the diagram. Very little consideration will show that the triangle  $rmn$  thus obtained is

identical with the triangle  $rmn$  obtained in Fig. 25. The proof is obvious and need not be repeated.

The advantages of this method of computing strains are, in the girder as in the cantilever, more considerable in complicated than in simple cases. Suppose that the girder carry two loads of 3 and 7 tons respectively at different points. (See Fig. 36.) From a point  $a$  set vertically downwards  $ab$  to any scale of weight equal to 3 tons, from  $b$  set down  $bc$  equal to 7 tons, and from  $c$  set upwards  $ce$  equal to  $R_1$ , the reaction from the right-hand abutment;  $ea$  will then be equal to the reaction from the other abutment. These reactions, as before, are ascertained by the dotted polar diagram. From  $e$  set off horizontally  $eo$  equal to  $d$ , the depth of the girder, and join  $oa$ ,  $ob$ , and  $oc$ . From  $r$  draw  $rm$  parallel to  $oa$  until a vertical line through the centre of gravity of the load of 3 tons is reached at  $m$ . From  $m$  draw  $ml$  parallel to  $ob$ , till a vertical line through the centre of gravity of the load of 7 tons is reached at  $l$ . From  $l$  draw  $ln$  parallel to  $oc$ . If the drawing be accurate, the point  $n$  should correspond with the corner of the right-hand abutment. Ordinates from  $rn$  to the outline  $rmn$  will give the values of the strains in either flange at any point to the scale of weights employed. It would be found on trial that the polygon  $rmn$  corresponded with that obtained by summing the triangles arrived at by considering each of the loads separately, as explained in connection with Fig. 31. The system is applicable to any number of loads, until, by considering a distributed load as an aggregate of many small loads, an outline similar to that shown in Fig. 29 would be arrived at.

#### TECHNICAL DICTIONARY OF ARCHITECTURAL DESIGN AND BUILDING.\*

THE idea of publishing a dictionary of technical terms relating to architectural design and construction, with derivations and French and German equivalents, is an excellent one, if accuracy and research were combined. There are many technical dictionaries, but few of which the student of architecture can avail himself. For example, the terms "hexastyle" and "decastyle" should have the Greek prefixes *hex*, six, and *stylas*, a column, or *deka*, ten, and *stylas*, a column, affixed, by which attention being called to the derivation of those terms, the student is more likely to remember the meaning of the terms, especially if he have not had the advantage of a classical education. In these days of intercourse with foreign countries, France and Germany more particularly, the value of equivalents in the French and German languages cannot be overestimated. Messrs. Ward and Lock's new technical dictionary, compiled by the Editor of the *Technical Journal*, furnishes these equivalents, or synonyms.

Taking a few terms at random, we have aspe for example, syn.. French *chevet*, German *baseliken*. The pronunciation is also given, "shay-vay." Bow window is in French *fenêtre circulaire*, and in German *bogenfenster* (*bogen* an arch and *fenster* a window), pronounced "bogen-fenn-sterr," or *zirkelrunde fenster*, from *zirkel*, a circle, and *rund* round. Bridge is fully described—French *Pont*, German *Brücke*. In French a stone bridge is termed *Pont de pierre*, in German *Brücke von stein*. A wooden bridge in French is *Pont de charpente*, in German *Holzbrücke*. An iron bridge in French is *Pont en fer*, in German *Eiserne brücke*, &c. Gable is derived from the German *Gabel*, a fork; the French for the word is *Pignon*, pronounced "ping-yong." In German it is *Giebel*. Sash in French is *Fenêtre croisée*, in German it is *Fenstergerühme*. *Fenêtre à coulisse* is the French synonym for a sliding sash window. A lifting or vertical sash window is called *Fenêtre à guillotine*; a casement, or French window, is termed *croisée*. The French for sash-panes is *panneau de fenêtre*. Looking over the dictionary, we find that the technical building terms referring to workmanship and materials are pretty fully described, and their equivalents in French and German given; and if the accuracy of those we have referred to may be taken as a fair sample of the work throughout, we can congratulate the editor on the usefulness

\* Ward and Lock's Technical Dictionary of Architectural Design and Building Construction.

of his labours. The definitions are brief, and concisely stated. The definitions of building construction indicate generally a practical knowledge of the subject. As the French now the language of the civilised part of the Continent, and as the German methods of technical instruction are beginning to be adopted in our schools, Messrs. Ward and Lock's "Technical Dictionary" will be found of service to thousands of our artists and art workmen.

#### IMPERFECT ROOF-GUTTERS.

A LARGE yearly expense to owners of houses property arises from the repairs that become necessary to ceilings and roofs by the entrance of rain. If there is a gutter in front behind the parapet—a very usual form of construction—the front wall of the house becomes saturated, should there be any leakage. The wall papers of the upper rooms become disfigured by large spots of damp, which turn into mildew, or the paper peels off. The ceiling is also spoiled. The cause of the mischief will generally be found to be either bad masonry, or inferior workmanship—often both combined. The gutter is laid with zinc instead of lead, or the flashings are badly put in or turned into the joints of brickwork. Directly a hard driving rain sets in, the wet is driven behind the upturned lead or zinc and the gutters, and penetrates the brickwork or floods the ceiling. Patching is resorted to, but the remedy has to be repeated, and with worse results every time. The constant expense of these repairs becomes a serious reduction from the rental; yet we see hundreds of houses erected in the same manner, and long-suffering tenants enduring the discomfort and unsightliness of dampness above their windows. It is no one's duty to look after the gutters and roofs of houses "run up to let or sell. The edge of the lead gutter ought to be turned up, and the flashing made to cover it. The common mistake is in not giving a proper lead apron or flashing which hangs over the gutter; sometimes these are narrow pieces of zinc or lead insecurely inserted in the brickwork. Instead of being tucked into the joints quite 1½ in. or 2 in., well wedged in and cemented, they are roughly turned into the joint filled with common mortar, the lime of which destroys the lead and allows the water to enter. Cement is rarely used. Another equally common plan of preventing damp penetrating into chimney stacks on roofs is to form a cement filleting round the stacks. The cement cracks in a short time by the shrinking of the roof timbers or settlement, and the rain finds its way through the brickwork. Then there are bad samples of plumber's work: lead is not inserted as it should be round the brick chimney in the form of step-flashing, but slate flashings and other inferior kinds of checks are formed in cement. We have seen, too, lead on gutters and zinc flashings in defiance of the well-known fact that the two metals set up a galvanic action which soon destroys the latter. It is a pity that asphalt is not more frequently used for forming inside gutters; but it is useless to suggest new and better materials to builders so long as the under-bidding system prevails.

The church of St. Giles, Cripplegate, is now undergoing alterations and improvements. The chancel is being raised 9 in., brought further west towards the second column, and will be inclosed with a short light iron screen. The choir stalls are being brought more into the body of the edifice while the pulpit is moved in the same direction. The floors have been relaid. The work is being done under the supervision of Mr. Churchwarden Leonard Cubitt, by Messrs. Dove Brothers of Lothbury. The church will be reopened on Thursday, October 11th.

The village church of North Stoke, on the western slope of Lansdown, was reopened on Friday after restoration, carried out at a cost of £480. Besides the general repairs to the building the restoration includes new pews and pulpit, new east window, heating apparatus, new windows in nave, plastering internal roof of nave, new tower door, churchyard rails and gate, and new church furniture. Major Davis, F.S.A., of Bath, acted as honorary architect, and the contractors were Messrs. W. Cowlin and Son, of Bristol.

Gustave Gaut, the Viennese decorative painter died on Friday, aged 52 years.



## Building Intelligence.

**KIERLEY HILL.**—The new schools at Mount Pleasant, Quarry Bank, for the Kingswinford Local Board were opened on Monday last. They have been erected from the designs of Messrs. G. B. Nichols and Son, architects, Coleridge-row, Birmingham, by Messrs. H. Dorset and Son, builders, Cradley Heath. The buildings are planned for the accommodation of 360 children. The materials used are red brick, covered with moulded and other bricks. The walls of the rooms are partly open, the ceilings are painted, stained, and varnished, and are well lighted by large windows, the upper parts of which are fitted with Leggott's casement adaptors. The floors are laid with wood block paving. Boyle's inlet ventilators are used, and there are also outlet and ventilating turrets in the roofs. The schools are heated throughout by hot-water apparatus, supplied by Mr. J. Stoddard, engineer, of Stourbridge. The lavatory fittings are of Macfarlane's manufacture.

**HARROGATE.**—The Bishop of Ripon laid on Friday the memorial stone of a new Church of St. Andrew at Harrogate. It is situated in St. Andrew's-place, and is being built from designs by Messrs. H. E. and A. Bown. The ground contains vestibule and entrance-hall (14ft. by 20ft., by 15ft.), and reading-room (40ft. by 15ft. 6in.). On the first floor is a conversation-room, with cloak-room. The lecture-room, on this floor, measures 40ft. by 25ft. 6in. (17ft. high, with open-timbered roof. These rooms can be thrown together, thus affording accommodation for 250 people. The basement is devoted to the use of the caretaker. The style adopted is Late Gothic.

**KILMAURS, N.B.**—The old parish church, built in 1403, has lately been demolished, and a new structure raised in its stead was opened on Sunday. During the demolition of the old building numerous hewn and carved stones, apparently taken from other buildings, were found in the walls. The old walls were taken down to the ground level and new ones erected on the old foundations. A tower rising to the height of 90ft. has been added, and in it will be a belfry and belfry. The seats are about the same in number as in the old church. For the benefit of former days a platform has been substituted, and a choir seat in front. The object of the rebuilding and improvements will be about £1,500. Mr. Ingram, Kilmarnock, was the architect.

**STOCKPORT.**—The new Technical School, the foundation stone of which was laid with much ceremony on Saturday, is being built from plans by Mr. George Sedger, of London, selected in competition, and is estimated to cost £11,000. The portion of the basement devoted to students is to be taken up by a lumber shop and classroom. On the ground floor, in the front there will be the secretary's office, the council chamber, a reference library, and a lecture-room. The bulk of the space on this floor, however, will be appropriated to the teaching of chemistry and dyeing. The upper floor will be an art school. One room in the front is to be used for machine drawing, another for modelling, and a third for painting. A long room at the side will be the elementary room, and in it space will be provided for students engaged in drawing from life. The style of the building is English Renaissance, carried out in stone and brick work. The site is in Wellington-road South, on land belonging to the Governors of the Stockport Grammar School.

**SUNDERLAND.**—The Hylton-road Board schools, Sunderland, were formally opened on the 6th inst. They have been built at a cost of about £8,000, and are planned to accommodate 1,300 children in four departments. The buildings are executed in brick with moulded dressings. The roofs are covered with Penhryn slates. The work has been carried out by Messrs. D. and J. Ranken, Stockton-on-Tees, Sunderland. Mr. R. Carter has been the clerk of works for the schools, which were designed by Messrs. Oliver and Leeson, of Newcastle.

An organ, built by Messrs. Vowles, of Bristol, was opened last week at Winford parish church.

## Engineering Notes.

**CAPUTH, N.B.**—The new bridge over the Tay, now being built to supersede the ferry at Caputh, will be finished and opened for traffic in about three weeks time. The bridge consists of three spans, each of the landward ones being 137ft., and the centre 140ft. long; the roadway has a breadth of 20ft.; and from the summer level of the water up to the bottom boom of the girders is a space of 15ft. The girders are of lattice type, and made of mild steel. The piers up to the water level are hollow cylinders filled with concrete, resting on a bed of coarse gravel 10ft. beneath the channel of the river, and thence up to the girders they are solid masonry. The floor is also steel of the ridge and furrow pattern, placed longitudinally, and supported by crossed girders. The steel floor is covered with asphalt, with a topping of gravel. The abutments on the banks of the river are of solid masonry, with stone pilasters. The structure was contracted for by Mr. William Arrol, and its progress has been under the personal supervision of Mr. Thomas Arrol. The cost has been £5,000.

**OSSETT.**—The Great Northern Railway Company is at the present time engaged in building a new town passenger station at Ossett, to replace the old one, which has long been inadequate; and, by the co-operation of the Ossett Local Board, new approaches are being formed. There will be a new and direct road from the Market-place, carried over the new station by a bridge, and continued towards Horbury. The new station is to be upon the island principle, with a platform 160 yards long and 31ft. wide. About half the length will be covered with a glazed roof, supported on cast-iron columns. The buildings will be in the centre of the platform, of wood and glass, and will be in three blocks, separated by wide passages. The surface of the platform is to be of concrete, with stone edges, and will be approached by means of a covered passage, 6ft. wide, leading on an incline direct from the new thoroughfare already mentioned. The fabric of the roadway bridge over the station is being built by the company. It will be 250ft. long and 30ft. wide. It is divided into four spans, including two of nearly 70ft. each, carried on iron girders, with corrugated trough flooring. The abutments and piers are in brickwork. There will also be twelve lines of rails under the bridge, besides cartways. The road, which the Local Board will provide, is about 1,000 yards long and 36ft. wide. The company's works are being carried out, under the direction of the district engineer, Mr. W. Kell, of Leeds, by Messrs. W. Nicholson and Son, builders, Leeds, and Messrs. J. Butler and Co., Stanningley—the latter firm executing the ironwork. The contractors employed by the Local Board are Messrs. Aliffe and Mr. E. Ellis, under the direction of Mr. Hirst, the board's surveyor.

A start has been made with the restoration of the well-known Mayor's Chapel on College-green, Bristol. The city council voted £2,000 towards the work, but in order to carry out all that the committee deem necessary, about £3,500 will be required, and the balance will have to be met by private donations. The contract has been let to Mr. W. H. Cowlin, and the work will be carried out under the superintendence of Mr. J. L. Pearson, R.A. It is expected to occupy about nine months.

On Tuesday week a park, the gift of the Duke of Devonshire to the town of Keighley, Yorkshire, was opened by Lady Edward Cavendish. The site was formerly known as the Devonshire Park Estate, occupying an area of 9½ acres. The work of laying out the land has been proceeded with under the direction of Mr. Kershaw, of Brighouse, and the cost so far has been between £1,000 and £1,200.

Mr. Charles C. Jones, M.S.A., of Charles-street, Cardiff, and Mr. H. W. Donnelly, of Dublin, have been appointed joint architects for new paper stores and envelope factory for Messrs. Cowan and Co., of Dublin, Ireland.

Mr. W. Oldham Chambers, F.R.I.B.A., has been nominated on the supreme jury of the Brussels Exhibition, and also as president of the pisciculture jury at the same exhibition.

## COMPETITIONS.

**COPENHAGEN.**—The corporation of this city invite designs for a new town-hall, the cost not to exceed £140,000. The design is to provide for an entrance-hall, a covered carriage approach and courtyard, assembly hall, magisterial offices, library, police-station, accommodation for resident officials, and a restaurant. The building is to be lighted throughout with the electric light. Designs are to be sent in by March 1, 1889, and for the three best premiums of £300, £250, and £200 each will be given. The corporation will then invite final drawings and plans with estimates of cost from the competitors selected. The successful competitor in the second competition will receive a sum of £500, and the others one of £160 each.

**FRIARS' SCHOOL, BANGOR.**—There were 124 competitors for this work, and the referee, Mr. Herbert Carpenter, is reported to have chosen 17, out of which recommended number of plans the governors selected six for the second competition, ultimately over-ruling the decision of the assessor by a majority vote of four in favour of including Mr. R. Grierson, an architect of Bangor, whose design, if we are correctly informed, was not among the series favourably mentioned by Mr. Carpenter. A correspondent hands us the following list of candidates as those selected by the referee for a final choice of six to be asked to prepare designs for the schools, each of which six competitors is to receive £20:—Mr. E. Burgess,\* Mr. R. Blomfield, Mr. C. Bell,\* Mr. R. Curwen, Mr. D. Colley, Messrs. Crickmay and Son,\* Messrs. Douglas and Fordham,\* Mr. Richard Davies,\* Mr. J. Fowler,\* Messrs. Giles and Gough,\* Mr. James, Messrs. Oliver and Leeson,\* Mr. G. D. Oliver,\* Mr. W. Barrett Smith, Mr. J. Slater, Messrs. Smith, Woodhouse, and Willoughby, Messrs. Weatherly and Jones.\* The candidates marked (\*) are specially commended.

**ROTHERHAM.**—The town council have selected and adopted from the twenty-three plans sent in by competitors for the market that under motto "Fireproof," which is by Mr. Archibald Neal, 19, East Parade, Leeds. The estimated cost of execution is £3,703.

## CHIPS.

The tower of Lym parish church is about to be rebuilt at a cost of £3,000 from the plans by Mr. J. S. Crowther, of Manchester. A tender was accepted on Friday last for the execution of this work.

Mr. E. H. Shorland, of Manchester and London, has just supplied his patent Manchester grates to the Cheshire Lines Railway Committee for their new station at Heaton Mersey, near Stockport.

The Grand Prix de Rome has been awarded by the Paris authorities to M. J. Tournaise, and prizes of the second category have been given to M. H. Sortais and M. E. J. F. Huguet. The first prize for sculpture goes to M. L. J. Conyers, and that for engraving to M. H. Leriche.

The Theatre Royal at Glasgow was reopened on Monday by Mr. Henry Irving, after having been redecorated and refurbished, works carried out by Messrs. Laurie and Son, St. Vincent-street, Glasgow.

The directors of the Exeter Theatre Company have formally adopted the plans by Mr. Darbyshire, of Manchester, for rebuilding their ill-fated theatre on the old site, the estimated cost being £6,000, inclusive of provision for furnishing and lighting by electricity. The old walls will be retained wherever possible, but the plan has been remodelled.

The tower of Berkeley parish church is being restored from designs by Mr. B. H. Ransford. Messrs. Gregory and Sons, of Berkeley, are the contractors.

The Sheffield school board have adopted plans by Messrs. Wightman and Wightman, of that town, for the new Manor school.

The memorial stone of a new school, which is being built by the Manchester School Board, in Waterloo-road, Cheetham, was laid on Monday. The new premises will accommodate over 1,000, at a cost of about £13,500. Mr. H. Lord is the architect, and Messrs. R. Neill and Sons are the contractors.

Healing Manor, North Lincolnshire, is now being remodelled, from the designs and under the superintendence of Mr. E. W. Farebrother, F.R.I.B.A., architect, of Grimsby.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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## NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII., XLVI., XLIX., L., LI., LIII., LIV., may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print. Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

ERRATUM.—In the article on "Carpentry and Joinery" last week, in the 3rd column, p. 299, where reference is made to Figures 2 and 3, it should be Figures 3 and 4 instead.

RECEIVED.—G. J. and Son.—S. A.—W. McF. and Co.—E. B.—W. P. Co.

A. G. (Watson and Co. or Stanley. Leave pawnbrokers' shops alone.)—A. T. (Measures Bros., Southwark-street, or Homan and Rodgers, Gracechurch-street; the other people you name are not up to much.)—R. AND SON. (Write the Falkirk Iron Company. You cannot do better.)—FIBROUS PLASTER. (George Jackson and Son, 49, Rathbone-place; their work is excellent always.)—BUILDER. (Have you tried Willing's copper letters? They are good and cheap. The things you mention stand no time.)—J. BARNES. (Sold up long ago; we had an execution in his place ourselves, and there were "no goods." If not a swindler, he was next door to it.)

## Correspondence.

## WORKMEN AND ANCIENT BUILDINGS.

To the Editor of the BUILDING NEWS.

SIR,—Our autumn recess has been enlivened by two interesting documents transmitted from No. 9, Conduit-street. One is headed "Hints to Workmen engaged on the Repairs and Restoration of Ancient Buildings"; the other, "Conservation of Ancient Monuments and Remains—General Advice to Promoters of the Restoration of Ancient Buildings." Both are endorsed with the impress of the Corporate Seal of the Royal Institute of British Architects, and both are signed by J. Macvicar Anderson, hon. sec., and William H. White, secretary.

I propose this week to deal with the first of the two documents, and invite the particular attention of my readers to the heading "Hints to Workmen"—not hints to architects, not hints to the foreman or clerk of works, not hints for the specification. The hints are subdivided into trades, and I will take the trades in the order in which they are printed, although that order is disorder, so far as custom extends.

I think that my daily experience of the British workman is as much as that of most architects, and much more than that of many, and I say at once, that the writer of these "hints" either does not know his business or the ways of the workmen, or he has ignored practice for maudlin precept. I entertain too high an opinion of Mr. Anderson and Mr. White to believe that they have any more to do with the "hints" than to subscribe their names; as a matter of fact, I do not know who wrote them, and I do not care.

The first trade is "Excavator," and amongst other hints he is told: "If you find old foundations, bases of pillars, ancient tombs, stone coffins, pavements, or other work which appear to be in their original place, do not remove, but carefully expose them to view." Is the excavator the man to know whether a base of a pillar or a stone coffin is in its original place? Is he to leave his digging to enter on an archaeological study as to whether the pavement is in its "original place"? And how he is to know—given his historical knowledge—that the old foundation is in its original place before he "exposes it to view"? I cannot imagine! He is, however, cautioned to expose them to view only when they appear to be in their original place. I should have thought the "hint" would run: Carefully expose all to view, and leave the distinguished architect and archaeologist to determine whether the stone coffin is or is not in its original place.

Again: "Do not permanently expose to view or to the air work which clearly was not intended to be so exposed." This is really ludicrous. The excavator is to dig, but he is not to permanently expose to the air; he is to determine the chemical properties of material, and to enter into the minds of his eight or nine century old father to know whether he meant this or that to be so exposed. I should like to see the foreman's face when he discovers the excavator at this little game.

The "hints" to the excavator are terminated by a piece of advice which, coming from a practical as well as artistic body of men, is simply appalling. "See that your drains are so managed as to draw the water from the foundations and not towards them." (The italics are those of the writer of the "Hints.")

Now, has the gentleman ever heard of the numerous examples of subsidence of foundations from this sole drawing off water from the foundations? Is he so hopelessly ignorant of his profession as not to be aware that the alteration of moisture in soils, such as would be caused by the draining he tells the poor excavator to perform, would be almost certain to lead to collapse of the structure? Fortunately, the excavator would not be the man to "manage" the drains at all, and the sooner a reprint of these "Hints" is issued, eliminating the last mentioned and perhaps the whole of those addressed to the "Excavator," the better for the profession, the better for the builder.

The next trade is the "Mason," and it would appear that he is the particular tradesman who is in the habit of "cleaning off whitewash." In doing this, however, he is to avoid the use of the tool, and study the best way of removing whitewash. Yes! I suppose the mason is the man (not the architect) to study how to clean off whitewash—at all events, the man who wrote the "Hints" as to this "cleaning off" does not know, and his hopelessly unintelligible two paragraphs distinctly prove it. "In removing broken or decayed work, do not take out any but such as is so far gone as to have lost all its original form; better have broken or half-decayed original work than the smartest and most perfect new work." Better have a broken and decayed three-legged chair which will in a few months bring to the ground its occupant than the smartest and most perfect chair of to-day, which will give pleasure to our posterity as the old one has to us. "Never remove or clean the old mossed surfaces." No! Let it accumulate moisture, so that the structure may be irretrievably damaged by wet rather than remove moss, notwithstanding that it will, in a few years, again appear in all its beauty of colour and effect.

"Ancient monumental remains are never to give way to new encaustic tile flooring, but are in every case to retain their old position." Can any "hint" be more ridiculous than this? The

rotten stone is to go to powder before our eyes, and trip up the congregation, rather than "encaustic" tile paving be laid down; but, however, tiles that are not "encaustic" be laid down.

After the "Carver" comes the "Plasterer," and in order not to weary my readers, I quote only one paragraph from it:—"It is absolutely necessary to take down the wall covered with old painting, it might be preserved in the following manner: the base of the wall might be carefully taken leaving only a thin piece behind the paint; this might then be backed up with cement pieces of large size inclosed in wooden frame. The painting might then be removed and deposited in a museum." Let us suppose a piece of painting, say 5ft. by 10ft. in area, been discovered under some plastering on the surface of a wall 3ft. thick.

The plasterer, not the mason, is to take down the whole of this wall till he gets to a thin piece behind the painting. What becomes of the original masonry which these "hints" have been so careful to preserve? Do the gentleman who wrote this learned paper care of a little matter called *bond*? Does he think that the plasterer can approach within a piece (whatever that may mean) of the real surface without the risk of destroying the whole of the painting and perhaps the structure too? This "hint" is absolutely irritating from the grossness of the ignorance which displays.

The "Carpenter" follows the "Plasterer," and after some sentimental bosh addressed to the architect who does what his foreman tells him to do, is told: "Do not as a general rule take a roof off to repair it, but rather repair it in place bay by bay, and only in the spring and summer months." This "hint" is, to a builder, really invaluable, and the writer of it here eternal thanks. It is this kind of advice which gives our Royal Institute its *raison d'être* to this practical education, combined with a glimpse it affords into the higher branches of our art, which makes me rejoice greatly to have paid my last subscription, and so been possessed of a "hint" which is simply priceless.

The Joiner is to adopt the same general line as are laid down for the Carpenter, and is told, in addition, to "preserve ancient seating in its proper place, if possible." Yes! the joiner the man to determine that ancient seating is in its proper place; but suppose that he should think that it is not in its proper place, and the architect or churchwardens should think it is? I suppose the architect and churchwardens would have their way; and then it becomes of the "hint"? This should be carefully considered in the second edition.

The hints to the Glazier, Painter, and Stonemason are to the point, and will not do harm. This is because the directions are general, and do not involve much knowledge of work and the way in which it is done; and after an address to contractors and workmen in general, in language with which we are now all familiar, which may or may not be the outcome of special knowledge, these "Hints to Workmen" close.

Now, Sir, I am a member of the Royal Institute of British Architects, and a desirous as any that it should be in every way worthy of its position. I have frequently been reminded that we are, in the eyes of the public, a body of practical men with educated notions, possessed of great constructive ideas, and thoroughly able to direct workmen, men, and builders. I can only trust that for the sake of this reputation, these "Hints to Workmen" as coming from the R.I.B.A. never get into the hands of the public. I have only hastily skimmed over the paper; I have not the least hesitation in saying that the literary production of an educated body almost beneath criticism, and that as addressed to workmen it is contemptible.—I am, &c.,

WM. WOODWARD.

7, Duke-street, Adelphi, W.C.

[We think so, too. Our conviction is just as Daniel Defoe wrote "The Shortest Way with the Dissenters," so Lord Grimthorpe, some other pleasant master of sarcasm dictated or penned these "Hints," and in a mysterious way caused them to be issued under the sanction of the sages in Conduit-street, Ed. "B. N."]



STRAINS.

—Mr. Middleton, in his letter which appeared in your last issue, instead of attempting longer to prove the truth of his new theory of shearing stress, or to disprove that of Rankine and every other writer on the subject, confines himself to two statements, both of which are equally incorrect.

1. He says that the fact of a beam built up of segments, with elastic joints, naturally gives the form of a string supporting equal weights at equal horizontal distances apart, if it does not prove his case, at least exposes the weakness of mine. How or why he does not care to suggest. Perhaps he fancies there is a tendency to shear between the two central points on the string, which might be quoted in favour of his theory; but, unfortunately, there is no such tendency.

2. Failing to read aright the very simple shearing stress diagrams in my previous letter, he says—"At each abutment, according to Colonel Seddon's reason, there would be no shear."

Now, my diagram purposely showed no abutments, but simply dealt with three upward and three downward vertical forces acting on a beam. (there should have been arrow-heads on the force lines to indicate their directions).

I thought to have been perfectly clear to Mr. Middleton that, in applying it to the case of a beam supported at three points and carrying three loads, the ends of the beam beyond the loads must represent the portions resting on the abutments, where there could not be any shearing stress; whilst the extreme forces, *a*, to *A* and *B* would represent the reactions, and the diagram areas adjoining them showing the shear from each abutment to the next. It is equal to the reaction at that abutment.

Closing this correspondence, I think it right to state that my only object in starting this was to save those who look to your columns for instruction from being misled into adopting a theory which no examiner would accept, and ever firmly Mr. Middleton may choose to stick to his own ideas.—I am, &c.,  
H. C. SEDDON.

—Under the above heading correspondence has appeared in your pages for several weeks, originating in a certain statement made by Mr. Middleton in his article of July 20th. It was an important statement on shearing stress, at variance with generally accepted theories, and put forth without any proof whatever. The following weeks naturally brought replies commenting on this, and on August 3rd another appears from Col. Seddon ridiculing the idea. On the 17th Mr. Middleton replies in a very impertinent manner, still adhering to his theory, without a particle of proof, and at the same time attempts to teach Col. Seddon shearing stress. On August 31st, therefore, Col. Seddon goes carefully through the whole with diagrams, and absolutely proves the recognised theory of shearing stress which Mr. Middleton attempts to upset. What was my surprise, therefore, to find in your issue of today a letter from Mr. Middleton, still adhering to his new theory. As before, he does not put forth a particle of proof of his first statement; but attacks Col. Seddon's letter, and fully misunderstands certain parts of it, and proves that there is a shearing stress in beams, at their abutments, a fact of which no one ever doubted. It will perhaps be remembered that Mr. Middleton proved to his own satisfaction that in a uniformly loaded beam, supported at the ends, there is a shearing stress  $\frac{W}{4}$  at the centre, whereas Col. Seddon proved it to be nil. This is the point now under discussion. Mr. Middleton does not seem to know that there are other ways of proving the same fact, and on totally different grounds.—I am, &c.,  
FRED. G. EDWARDS.  
20, Leighton-road, Kentish Town,  
N.W., Sept. 7.

—I am not in the least inclined to pin my faith to Mr. Middleton's views, with which I don't agree; but though Col. Seddon's position almost gives him the right to speak *ex cathedra*, it is no refutation of Mr. Middleton's story to snub him for "attempting to fly in the face of the whole engineering world." The usual theory is summed up in two rules

on page 18 of "Wray." The first, relating to beams fixed at one end, is not under dispute. The second is as follows: "In the case of beams supported at each end, the shearing stress at any section is the difference between the reaction at either point of support, and the total weight lying between that point of support and the section in question."

This is, I think, proved by the following considerations:

"Shear" is caused by two forces, the load on each abutment and the reaction at that abutment opposing, but not meeting each other. If they met, the result would be simply compression, but the reaction tends to pass the load (like the blades of a pair of scissors, to use the oft-quoted simile) either to the right or to the left. Therefore, there are two kinds of shear; and may I be permitted to save diagrams by calling the shear caused by reaction passing to right of load *R* shear, and to left of load *L* shear. These differences are indicated by arrows in "Wray."

Consider the case of a beam with a single load, *W*, in the centre. On the right of the load we have *R* shear =  $\frac{W}{2}$ ; on the left, *L* shear =  $\frac{W}{2}$ ; and where these two meet—i.e., under the load—they neutralise each other, and there is no shear at all. This has been overlooked by Mr. Middleton.

In the case of a beam with distributed load. Beginning at the left-hand abutment, we have *L* shear =  $\frac{W}{2}$ , diminishing uniformly to nil at the opposite abutment; but we must compound with this the *R* shear, which is =  $\frac{W}{2}$  at the right abutment, and nil at left, and this evidently contradicts Mr. Middleton's theory, for the result is as given in "Wray."

To illustrate the case of a beam with various loads, the following example is taken from an examination paper.

A beam *A B* 20ft. long, supported at both ends, is loaded as follows: (*a*) 8cwt. at 4ft. from end *A*; (*b*) 12cwt. at 8ft. from *A*; (*c*) 14cwt. in centre; and (*d*) 16cwt. at 15ft. from *A*. Determine the shearing at a point 6ft. from *A*.

The reactions are—

	At <i>A</i> .	At <i>B</i> .
Due to load <i>a</i>	= 6½	1½
" <i>b</i>	= 7½	4½
" <i>c</i>	= 7	7
" <i>d</i>	= 4	12
	24½	25½

Therefore, at the given point we have—

Shear due to <i>a</i>	= <i>R</i> 1½	
" <i>b</i>	= <i>L</i> 7½	
" <i>c</i>	= <i>L</i> 7	
" <i>d</i>	= <i>L</i> 4	
Total	<i>R</i> 1½	<i>L</i> 18½

—i.e., *L* 16½

By "Wray's" rule we have—

$$24\frac{1}{2} - 8 = 16\frac{1}{2}$$

Similarly we have—

Shear between <i>A</i> and <i>a</i>	= <i>L</i> 24½
" " <i>a</i> " <i>b</i>	= <i>L</i> 16½
" " <i>b</i> " <i>c</i>	= <i>L</i> 4½
" " <i>c</i> " <i>d</i>	= <i>R</i> 9½
" " <i>d</i> " <i>B</i>	= <i>R</i> 25½

This is beautifully shown by the graphic method, not mentioned by Mr. Middleton.

But suppose we are asked the shear directly under load *a*.

As before—

Shear due to <i>a</i>	= nil
" <i>b</i>	= <i>L</i> 7½
" <i>c</i>	= <i>L</i> 7
" <i>d</i>	= <i>L</i> 4
	<i>L</i> 18½

This case is not provided for by the rule. The result above evidently = reaction — proportion of load *a* borne by abutment. So under *b* the shear will be found to be *L* 9½ under *c* *R* 6½, under *d* *R* 13½. Criticism on this last paragraph is earnestly desired.—I am, &c.,  
C. A. B.

LYDFORD CHURCH.

SIR,—A paragraph in your current issue announces that the chancel of this interesting church, on the borders of Dartmoor, is to be re-

roofed and restored from plans prepared by W. S. Hooper, of Hatherleigh. Some years ago the late Sir Gilbert G. Scott, R.A., by request, made plans for the renovation of this church; and sometime afterwards the late Mr. G. E. Street, R.A., also did the same thing. I believe it is no secret that the two sets of plans, although not carried out, were detained, but never paid for! More latterly, a Midland architect prepared fresh plans for the long-talked-of work of renovation; but so recently as June last these proposals were thrown overboard "for want of funds."

Can the paragraph in question be quite correct, therefore? More folks than the writer on this point feel somewhat CURIOUS.

ARCHITECTURAL PLAGIARISM.

SIR,—I notice by your Correspondence column that there is yet life in the above topic. I am glad that this should be so. For when the foundations of one's faith are being ruthlessly dug away, and that undermining operation elicits no active opposition, no powerful measures are taken to resist, then in such a case we may rest assured that faith does not exist—has long since been dead.

When "Evolution" enters the field with sharp-witted arguments as the opponent of Christianity, if the latter in its somnolence should remain inactive, and is at no pains to defend its principles, then is Christianity dead. And if when "idea" springing forth from the furnace of thought known unto man as "originality," sheds a light upon the crooked ways of plagiarists, the latter are found standing in arms to defend their principles, their ancient ways, then "plagiarism" is not dead.

Mr. Percival thought there was something—much, in fact—to be considered in my letter. Mr. Calvert does not. There are thinkers, and there are thinkers. The lower powers, I presume, are subject unto the higher. The "Culvert," the lower power, is subject unto the "invert," the higher. The one endures physical drudgery and, I presume, is happy, the other soars aloft, and metaphorises the vault of Heaven. So the plagiarist enjoys mental slavery, and his compeer towers above, seeks individuality of expression, and embodies in his composition self-sentiment. After this labour of genius the position becomes reversed, the higher powers have performed the drudgery and the lower step in to "copy"—merely to copy, to reproduce, to, if possible, reflect that which has been by colossal energy—they themselves know not even how—done.

How to obtain individuality? To be original or not to be original—that is the question. But the professional amateur has it—he is original without an effort. Lord Grimthorpe has impressed upon St. Alban's Abbey marks of individuality; there is to be seen the ponderous or legal style, and any style is better than none. And why copy? Mr. Waterhouse has a beautiful and well-proportioned tower subtending the National Liberal Club; displays geometrical conception, and is the expression of an elevated mind. This is built. Another tower, but not built, was designed by Mr. Statham and Mr. Slater, and appeared in the *Builder*, and exhibits poetical treatment, unconventional, untrammelled—it is essentially beautiful. It should have been built for the sake of the design. Here are three examples of individuality, and one is not—not professional. But why in the next competition should the first mentioned tower be constantly startling us with its reappearance, as if it had no owner? Why not let it rest undisturbed the sentinel of Northumberland-avenue? There is a wise, most wise, rule in vogue at the South Kensington Museum, and at all other art galleries—"The works of living artists are not, without their permission, to be copied."—I am, &c.,

CHARLES GUY HALL, A.R.I.B.A.  
12, Lower Phillimore-place, Kensington.

HADDON HALL PANELLING.

SIR,—As one of those described as "Vandals" who took part in the discussion recently at Haddon Hall, concerning the removal of the paint on the panelling in the ballroom or long gallery, before the "shocking treatment" which led to the "Hartshorne v. Oil" controversy, I am rather interested in the question,



taking Dr. Furnival's view of the matter, and thinking Mr. Hartshorne entirely in the wrong. No better evidence of his mistake could be mentioned than that afforded by the beautiful oak fittings in the chapel at Haddon, and also the woodwork in the apartment under the drawing-room, now known as the "dining-room," where the panelling and its carved enrichments have never been bedaubed with colour like the so-called "staining" on the wainscoting in the long gallery or ballroom,\* the hue of which the anti-scrapists seem to so greatly admire. The delicate moulded parts of the chapel fittings† were gilt; but no other colouring was used, and in the "dining-room," where the oak has grown grey with age, its surface remains as the craftsman left it. To my mind, this original treatment is so infinitely more interesting than the besmeared effect of the ballroom colouring, that I can hardly understand any one seriously objecting to the careful removal of the paint, especially as at best it only perpetuates the ignorant blundering of some workman employed to "do the place up" about the middle of the seventeenth century. The long gallery was built nearly a hundred years previous.—I am, &c.,

Sept. 12.

MAURICE B. ADAMS.

## SCOTTISH MASONS' MARKS.

SIR,—In your issue of to-day reference is made to a paper on this subject by Professor T. Hayter Lewis, F.S.A., in which he says:—"Many, if not most, of those strange marks had a definite meaning," and further on he alludes to "the great mind that was their pioneer."

Now, I don't think there is anything mysterious about these masons' marks. In his "History of Freemasonry in Scotland," Mr. D. Murray Lyon illustrates a number of these marks, and says: "There is no ground for believing that in the choice of their marks the 16th century masons were guided by any consideration of their symbolical quality, or of their relation to the propositions of Euclid. . . . A large proportion of them represent the initials of their owners' names, and they are nearly all of a sufficiently simple character to permit of their being cut upon the tools of operative masons and the productions of their handicraft, or used as signatures by such as had not been taught to write."—I am, &c.,

Sept. 7.

W. P. BUCHAN.

## SHORTNESS OF THE EXPECTATION OF LIFE IN THE FIFTEENTH CENTURY.

SIR,—The following is a copy of an inscription taken from a brass in the village church of Sprotborough, near Doncaster:—

"Hic jacet Wills Fitzwilliam dñs de Sprotborough armiger et Elizabeth uxor ejus filia Thome Chalkorth, militis qui quidem Willms obiit apud Hathillan primo die mensis decembris a<sup>n</sup>i dñi millmo ccc<sup>o</sup> lxx. quarto et predicta Elizabeth . . . die mensis . . . anno dñi millmo ccc<sup>o</sup>."

The brass consists of two effigies, a knight and his lady, and below them the inscription in Latin, as I have given it. The fact that the date of the death of the knight is recorded on the inscription, while that of his wife is omitted, leads one to suppose, and no doubt correctly, that the effigies were erected by the latter to the memory of her deceased husband. The curious part about it is that although the knight died but one-and-twenty years before the close of the 15th century, the belief in longevity must have been so slight that it was calculated impossible for his wife to live into the succeeding century. Hence, although the day and month of her decease are entirely omitted, the blank spaces intended for them never having been filled in, still the cutting of the four c's, followed by the conspicuously-placed stop, was, no doubt, in the mind of the person who erected the brass the limit of her age.

Never having heard of a parallel case, and thinking that this may be of interest to antiquarians and others connected with monumental brasses, I venture to send you a copy of the inscription.—I am, &c.,

HENRY GILBERT GAMBLE.

Gainsborough, Sept. 10.

\* For view and details of this woodwork see BUILDING NEWS, Aug. 17, 1888.

† Illustrated to scale in the BUILDING NEWS, April 2 and 16, 1876.

## Intercommunication.

## QUESTIONS.

[9746.]—**Ownership of Drawings.**—I shall be glad if any of your readers would kindly give me information or quote any case or cases settled legally as to right of ownership of plans and specifications, more especially if estimates have been obtained; but through circumstances best known to the client the carrying out of the work has been abandoned or, at all events, postponed. I may say that my client has paid the usual half commission on the lowest tender received in settlement of my charges for work done; but the plans and specifications, which are in my client's possession, have not been returned, and the question arises whether I can legally demand the return of the plans in the event of his refusing to do so. It appears to me that my late client could employ another architect and carry out the work from my plans and specifications if disposed, who would probably be paid the other half of commission. This would seem unfair, as all architects are aware that by far the greater half of the work has been done, as also artistic and brain-power expended when the plans, &c., are made.—SUUM CUIQUE.

[9747.]—**Groining.**—Will anyone kindly tell me of any good book on groining, especially dealing with 16th-century woodwork and fan tracery, showing how the ribs are struck out and panels let in.—D. M.

[9748.]—**Ruins near St. Alban's.**—Will some of your readers give information about the ruined buildings in the neighbourhood of St. Alban's, particularly Goresmanbury, which I am told was formerly the residence of Sir Francis Bacon. There is a curious piece of work, apparently detached from the building, containing an statue of a man in armour. Any information will oblige.—ENQUIRER.

[9749.]—**Half-Timber Work.**—What is the correct way in which to describe the curves of radiating timbers in gable tops? Should they be concentric, or are the different pieces segments of the same circle?—M.

[9750.]—**Bargeboard.**—Perhaps some of your readers would kindly give a sketch of section through bargeboard and gable-end at A B on sketch, showing manner



in which bargeboard is fixed to purlin, and also showing the way in which these purlins are carried through timber work of gable.—M.

[9751.]—**Italian and French Renaissance.**—What is the best work on Italian or French Renaissance illustrating details of old buildings?—M.

[9752.]—**Highest Spires in South London.**—Can any reader give me heights of loftiest towers and spires in the metropolis, south of the Thames?—E.

## REPLIES.

[9700.]—**Quality of Woodwork.**—Mr. Stevenson seems to dispute my statements entirely respecting timber and deals, but does not give sufficient reasons for so doing. Does he mean to say there is no Memel timber in the market now? I know that I have purchased logs some years ago that were distinguished in the way I before stated, and although Mr. S. says there is no sorting now, he admits there are three qualities. He also disputes my statement that Petersburg deals are now the best for joinery and small scantlings. I still contend that in this I am correct, both in regard to durability, strength, and colour, especially where a varnished surface is required. His remarks on Archangel deals show that he can never have seen the old importations (which, unless far advanced in years, is very likely). They very nearly resembled pitch pine in colour and grain, being full of resinous matter, while the present samples are nearly white, and I am quite willing to admit that they are unfit for the purposes named, because, as I before stated, they are a spurious article brought in under a name belonging to a superior deal not now in the market. With regard to dryrot, I have known a good many floors that have suffered from this cause, and on investigation have found them invariably to have been from Swedish deals and foreign-sawn boards—in one case the boards had only been put down about a year. In similar situations Petersburg deal has not suffered at all. Many of the floor-boards imported will be found on examination to have a large amount of sap upon them, and are evidently outside slabs from logs cut up for other purposes, and will frequently twist after laying down. Then with regard to Swedish timber used for carpentry, I have seen many instances where, when used as joists, the ends have decayed in the walls within five years. Mr. S. says nothing about the inferior strength of Swedish wood. As he has undoubtedly good opportunities of testing it, let him do so, that we may compare with the experiments made by Tredgold and others in better qualities of timber. The old London architects were practical men, and would have all scantlings for carpentry cut out of Memel logs. I happened to be in the South of England about 48 years ago and saw a beautiful log of Memel being cut up into scantlings 3in. by 2in. I asked why they did not cut them out of 1lin. deals; the reply was "that it was to be used in works to be carried out under a London architect, and

both he and London architects generally insisted upon being out of logs of the best quality." Mr. S. continues makes admissions confirming what I have before stated where he speaks of Gronoff's St. Petersburg deals as Omega goods of first-class shippers. The first has always been held in high estimation ever since I can remember. Omega is also good, but I defy him to produce a receipt for importation of Archangel at all like that of 50 years ago.—DURABILITY.

[9740.]—**Headstones and Monuments.**—The query was put and has been replied to before, and our "Constant Reader" has seen it? By far the best modern work upon the above subject is "Ancient Sepulchral Monuments" (1887), by Messrs. Brindley and Weather, Its price is £3 3s., and it gives nearly 700 examples, drawn to scale. Cutt's "Sepulchral Slabs and Crosses," published by Parker (1849) is another reliable and useful, though not nearly so exhaustive, a book.—HARVEY HEMS, Exeter.

[9741.]—**Drainage of Country House.**—Leading the waste-pipe from a sink and that from a bath into the same trap that serves for the water-closet is not good sanitary work. It would be better to put up a blow-off ventilating pipe from the outer end of the disconnect trap to ventilate the 60ft. of drain between the cover tank and the house. If "Stack-pipe" sends me I address I will forward him some illustrated circular which will give him information on the subject.—W. BUCHAN, Glasgow.

[9744.]—**Surveyors' Institute Examination.**—I have received letters from several gentlemen who propose to sit at the above examination, evidently thinking that I do nothing but "coach" pupils for technical exams, generally. I hope these candidates will not consider me discourteous in not answering them, as my time is much occupied at present. I would refer "H. J. G." and others to the recognised tutors, Mr. Adams, City of London College, and Mr. Middleton, St. James's Hall. I find the Government competitive exams are quite enough for me to cope with.—JOHN R. SMITH.

[9744.]—**Surveyors' Institute Exam.**—"H. J. G." can obtain full particulars upon application to the secretary, 13, Great George-street. The course of study depends in a measure upon the sub-division of the candidate. If in the Building Section, a class in Quantity Surveying at the Birkbeck Institution, commencing October 2nd, would suit "H. J. G."; and if he cares to communicate with me, I may be able to give suggestions as to the other requisite subjects.—H. BUSHELL, 1, Finsbury-circ., E.C.

[9744.]—**Surveyors' Institute Exam.**—As far as I know, no regular classes are held for the above, and should advise "H. J. G." to trust to his own perseverance to master the various subjects. I presume it is his intention to enter for the Professional Associates' exam, next year; but the choice of a subdivision must depend entirely upon his past experience and the class of work he is at present engaged in. The Land Agency subdivision requires the most book-reading, and the Building the most practical experience. "H. J. G.'s" best course now, if he has not already done so, will be to obtain copies of the Rules and Syllabus (price 1s.), and if he will communicate with me again I shall be pleased to give him any hints, hoping to have qualified myself for doing so by my own course in April last.—RICHD. WATSON, Plymouth-road, Totnes.

[9745.]—**Varicose Veins.**—Having suffered for the last two years from this complaint, my experience may possibly be of some use to "Draughtsman." I was advised by a well-known medical man to use unbleached calico bandaging. This I tried for some time; but it did not prove satisfactory, there being practically no elasticity in the calico, and this caused great pain by indenting the flesh when the legs became swollen, as was always the case after quick walking or mounting. I then tried the bandaging which is to be obtained of all vendors of surgical appliances (a kind of stockinette material). This has a certain amount of elasticity, and the price is moderate. I, however, experienced inconvenience by the bandages slipping, brought about by the variation in the size of the leg, consequent upon alternately exercising and resting. I next thought I would try silastic stockings, although the doctor had advised me not to do so. I found the satisfactory for a short time, but they very soon showed signs of wear, and also contracted about the heels, caused by perspiration, I think. The result was much pain, and before two months had expired I determined to abandon them. I have now returned to the stockinette bandaging, and I am quite sure, if properly put on (which, of course, can only be done after much practice), more support and comfort will be derived from this than from any other plan which can be adopted. When efficiently bandaged, one can stand about all day with but slight fatigue; whereas without this aid I could not venture out for an hour with any degree of comfort, and should return done up, as I have done on one or two occasions when I fancied I was in good condition and could do without the bandages.—VARICOSE.

The excavations made on Saturday in the ruins at Bow Castle, near Gals Water, Berwickshire, have revealed the fact that it is built over a most ancient broch, having walls of dry stones 18ft. 6in. in thickness, and inclosing an open space 82ft. in diameter.

The foundation-stone of the new church of St. Dyfrig, in Temperance-town, Cardiff, was laid on Tuesday. The building will be of simple Gothic character, and will have gabled aisles. At present only the first section will be built, and for this the tender of Mr. F. S. Lock, of Cardiff, has been accepted at £3,500. The architect is Mr. John D. Sedding, of London.

The parish church of Hamilton was reopened for worship on Sunday, after undergoing considerable internal alterations and redecoration. The work has been carried out under the direction of Mr. J. L. Murray, of Heavyside, architect.



## LEGAL INTELLIGENCE.

**RE J. P. FLEW.**—At the London Bankruptcy Court, on the 5th inst., the first meeting held of the creditors of John Pearce Flew, of 10, Edith-road, West Kensington. The debtor in business about sixteen years since in partnership with H. Gibbs, as Gibbs and Flew, and in the business was turned into a limited company under the title of Gibbs and Flew (Limited), Mr. Gibbs retired. The debtor returned liabilities at about £190,000, the bulk of which were secured; and there are also said to be mortgages to the amount of £500,000 outstanding in favour of the late firm of Gibbs and Flew. The debtor went into bankruptcy.

**SURVEYORS' VALUATIONS OF LAND.**—The agencies of the surveyors' figures in the compensation case of Bradshaw v. Cheshunt Local Board are somewhat remarkable. Mr. Bradshaw, it be remembered, brought a claim against the Local Board for injury caused to his freehold land at 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 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1000.

## WATER SUPPLY AND SANITARY MATTERS.

**EDINBURGH AND LEITH.**—A joint meeting of the committees of the Corporations of Edinburgh and Leith, on the question of the drainage of the Leith district was held on Monday. The meeting considered a report prepared jointly by the engineers of Edinburgh and Leith, and Messrs. D. and T. Stevenson, C.E., containing proposals for the drainage of the Water of Leith, from the bridge to the sea, at an estimated cost, exclusive of wayleaves, &c., of about £65,000. It was unanimously resolved to recommend the Corporations to approve of the scheme, and to authorise the committees to have the necessary plans and parliamentary notices prepared.

**SALTASH WATER SUPPLY.**—The town council of Saltash, at a meeting held on the 4th inst., unanimously resolved to adopt the scheme submitted by Mr. H. Bertram Nichols, A.M.I.C.E., of Grosvenor Chambers, Corporation-street, Birmingham, which was selected from an open competition advertised for some months previously, and Mr. Nichols has now been instructed to prepare the necessary plans, &c., to lay before the Local Government Board, so as to facilitate the immediate construction of the works. It is a gravitation scheme, the sources of supply being perennial springs at Trematon, situated about three miles from the borough of Saltash. The water has been analysed and found to be of exceptionally good quality for domestic purposes. Two storage reservoirs are proposed to be constructed at Trematon, and a line main conduit will convey the water to a covered service reservoir near the borough boundary, at the high part of the town, from which point distribution mains with the necessary appendages will be laid throughout the town. Arrangements have been made for the purchase of the necessary land, easements, and water-rights, the town council having appointed Mr. Nichols to represent them as arbitrator in the matter.

The town council of Colchester received at their last meeting a letter from the Mayor, Mr. J. N. Axman, offering to present to the town a bas-relief in marble, representing the opening ceremony of the International Exhibition of 1881, and executed by Count Odsfredi, of Milan. The bas-relief was exhibited at the recent Anglo-Danish Exhibition. The town council accepted the gift with thanks, and the bas-relief will be placed in the quadrangle of the Museum, under a glazed front, and, eventually, should the Town Hall be enlarged as proposed, it will be removed to that building.

Alterations have been made at the Grand Hotel, underland, embracing the ventilation, which is now carried out on the Boyle system, the latest approved form of the self-acting air pump ventilator being adopted for the extraction of the vitiated air.

## Our Office Table.

ACCORDING to Mr. John Brett, A.R.A., Sir J. C. Robinson is very late in announcing to the world that water-colours are often injured because the paper on which they are executed contains traces of the chlorine employed for bleaching the material. The discovery was made about 1854 by the late Joseph D. Harding, the landscape painter, who introduced a new sort of drawing paper known by his name and stamped with his initials. It was made of pure unbleached linen, finished with a slightly twilled surface, and containing very little size.

We note with pleasure a new drawing-pen, manufactured by Mr. H. C. Miles, of Clarence-road, Clapton, whose patented invention, like most other really useful adjustments, is exceedingly simple, and consists in a small arrangement which prevents the instrument becoming disabled through loss of the adjusting screw, at the same time allowing the free use of the pen in the ordinary way. It likewise permits the lifting up of the blade of the jointed pen for cleaning without the removal of the screw, and every draughtsman knows from experience how often loss of time results from the necessary hunt on the floor for the screw of his pen should it chance to roll off the board, or be knocked down, as not unfrequently happens. There is another advantage, too, to be noted in this pen, and it is that no spring is necessary, because the nut serves to regulate the nibs either way, and with the utmost nicety. The addition to the cost is merely nominal, and any drawing-pen can be fitted with the new screw.

## MEETINGS FOR THE ENSUING WEEK.

**TUESDAY.**—Glasgow Architectural Association. "Recollections and Reflections," by T. Gildard, hon. president.

## STATUES, MEMORIALS, &amp;c.

**BRISTOL.**—The statuary for the High Cross at Bristol, recently re-erected in the centre of College Green, is being executed, under the direction of the joint architects, Messrs. Hirst and Paul, of Bristol, by Mr. Harry Hems, of Exeter. The material used is well-seasoned Box-Ground Bath stone, and the Bath Stone Firms (Limited), from whose quarries the seven blocks were raised, have given especial attention to the selection of the material. The seated statues of King Henry VI., which will be placed in the niche facing eastward, and that of Queen Elizabeth, who will face west, are now all but complete. Carefully-studied drawings, by the architects and sculptor, have been prepared at Stourhead from the original statuary, and the *motif* of these is being very closely followed by the sculptor. Both figures wear crowns, and the Virgin Queen has about her neck a ruff of the period. Besides these two statues there are to be seated figures of King James I. and Charles I., and erect ones of Henry III. and Edwards III. and IV.

The dean and chapter are about to restore the chapter-house of Lincoln Cathedral, at a cost of at least £7,000. An excellent likeness of the Bishop of Lincoln, in his mitre, has been placed as a corbel near the north-east entrance of the cathedral. The committee for the erection of the Bishop Wordsworth memorial, executed by Messrs. Farmer and Brindley from designs by Messrs. G. F. Bodley, A.R.A., and T. Garner, have just published their report, showing that the total was £2,150. The memorial was illustrated in our issue of May 18 last.

The town council of Selkirk have received the gift from Mr. Craig Brown, of the old prison, for use as a free library. All the necessary alterations to fit the building for its new purpose have been made by the donor, who will also pay the cost of maintenance for two years.

At a meeting of the Clew-with-Weelsby School Board, held on Wednesday, Sept. 5, plans for new schools for 1,000 children, arranged on the central-hall system, were approved by the Board. Mr. E. W. Farebrother, F.R.I.B.A., of Grimsby, is the architect.

The first sod in connection with the Belfast Main Drainage Scheme was cut on Wednesday by the chairman of the Town Improvement Committee of Belfast. The work will be the most costly undertaking ever entered upon in Ireland, the outlay being nearly £300,000.

## Trade News.

## WAGES MOVEMENTS.

**LEEDS.**—The carpenters and joiners' strike which has been in existence for ten weeks, ended on Friday night, the men accepting the terms offered them by the Leeds Master Builder's Association—viz., that carpenters' and joiners' wages be at the rate of 7½d. per hour for skilled workmen, time and a quarter to be paid for the first two hours' overtime, and time and a half for every subsequent hour.

## CHIPS.

A new Episcopal church was formally opened at Lochearnhead, on Sunday. The chapel is built of the grey whinstone of the district, with red sandstone dressings from Dumfriesshire, while the roofs are covered with dark blue slates from Lord Breadalbane's quarries, and are finished with red tile ridge cresting. The little narrow mullioned and cusp-headed windows are filled with quarry glass, having coloured borders. The work has been carried out from designs and under the superintendence of Mr. George T. Ewing, of Crieff.

Mr. Donald Robertson, formerly master of Smith-street Branch School of Art, Birmingham, has been appointed head master of the Walsall School of Art.

Some Roman remains—which appear to be those of a palace of a prætor—have just been excavated in a field a mile north of Llantwit Major, under the direction of Mr. John Storr, the curator of the Cardiff Museum. The fragments found include the base of a column, considerable portions of tessellated pavement laid in wheel patterns, pieces of Samian ware, human and equine skeletons, and Roman coins of Victorinus, Constantius Chlorus, and other emperors.

The foundation stone of All Saints Church, Rockwell Green, near Wellington, Somerset, was laid on Monday. The building will be Early Decorated in style, and will be seated for 450 persons. Mr. J. Spencer Houghton, of Taunton, is the architect, and a contract has been accepted for erecting the building, with the exception of the tower, for £2,765.

A new organ, built by Messrs. Willis, was opened last week in the parish church of Quedgeley, near Gloucester. It has been given by Colonel Curtis Hayward, and an organ-chamber has been provided by the parish.

At Gosforth, near Newcastle, new Board schools, erected from plans by Mr. W. Bedington, of that town, were opened on Monday. They are Queen Anne in style, are faced with red brick and stone dressings, and accommodate 200 children.

Stirling-road Wesleyan Chapel, Birmingham, was reopened on Sunday, after being decorated by Mr. Teall, of Nechells, and renovated from designs by Mr. E. Harper, Colmore-row, Birmingham.

Corner-stones of a Masonic hall, which is being erected at Kirkburton, near Leeds, at a cost of £1,200, were laid on Saturday with full ceremonial. Brother J. W. Cocking, the W.M. of the lodge, is the architect.

**Holloway's Ointment** is not only fitted for healing sores, wounds, and relieving external ailments, but, rubbed upon the abdomen, it acts as a derivative, and thus displays the utmost salutary influence over stomachic disorders, derangements of the liver, irregularities of the bowels, and other intestinal inconveniences which mar man's comfort.

## DOULTING FREESTONE.

**THE CHELYNCH STONE.**—The Stone from these Quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable Stones in England.

**THE BRAMBLEDITCH STONE** is of the same crystalline nature as the Chelynych Stone, but finer in texture and more suitable for fine moulded work.

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 The most extensive Stock of every kind of  
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 immediate use.

### TENDERS.

\*.\* Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

**ARNOLD.**—For making, metalling, and channelling Portland-street, Arnold, near Nottingham, for the Arnold Local Board of Health. Mr. F. Jackson, C.E., 18, Low-pavement, Nottingham. Quantities by the engineer:—

Messom, F. ... ..	£287	0	0
Frost, W. ... ..	259	12	2
Greaves, J. ... ..	217	12	0
Cope, E. ... ..	211	3	0
Raynor, A. ... ..	210	3	2
Holmes, R. and G. ... ..	200	0	0
Hawley, J., and Son ... ..	195	0	0
Cordon, W., Burton Joyce, near Nottingham (accepted) ... ..	179	6	0

Engineer's estimate, £211.

**BECKENHALL.**—For the erection of cottages, for the Right Hon. Viscount Portman. Mr. G. B. Jewell, M.S.A., Yeovil, architect:—

Poole, A., Ilminster (accepted).

**BERMONDSEY.**—For providing and fixing new hot-water tanks at the Tanner-street Workhouse, for the Guardians of the St. Olave's Union. Messrs. Newman and Newman, 31, Tooley-street, London Bridge, architects:—

Bullers, J. ... ..	£55	0	0
Seaton, J. ... ..	48	10	0
Crane, B. ... ..	46	10	0
Slater and Owen ... ..	42	10	0
Greenwood, J. and J. ... ..	42	0	0
Oake and Richards ... ..	39	10	0
Summerscales and Sons ... ..	37	10	0
Bellchamber and Son ... ..	35	0	0
Benham and Sons ... ..	35	0	0
Balaam Bros. ... ..	34	0	0
Thompson, J. ... ..	32	15	0
Swales, A. (accepted) ... ..	32	10	0

**BERMONDSEY.**—For repairing and painting exterior and sundry works to the interior of Parish-street Workhouse, for the Guardians of St. Olave's Union. Messrs. Newman and Newman, 31, Tooley-street, London Bridge, S.E., architects:—

Balaam Bros. ... ..	£920	0	0
Parker, G. ... ..	797	0	0
Potton, G. ... ..	549	0	0
Bellchamber and Son ... ..	525	0	0
Martin, A. ... ..	480	0	0
Bullers, J. ... ..	475	0	0
Lilly, W. G. (accepted) ... ..	357	0	0

**BRAZIL.**—For machinery and plant, for Brazilian Extract of Meat and Hide Factory, Ltd., Porto Alegre, Brazil, from the designs of Mr. F. Colyer, 18, Great George-street, Westminster, S.W., civil engineer:—

No 1 contract—Extract of meat plant:—			
Fawcett, Preston, and Co. ... ..	£1,970	0	0
Pontifex and Wood ... ..	1,644	0	0

No. 2 contract—Patent water tube boilers:—			
Patent Steam Boiler Co. ... ..	2,579	0	0
Babcock, Wilcox, and Co. ... ..	2,060	0	0

No. 3 contract—Pumping machinery:—			
Simpson and Co. ... ..	997	0	0
Waller, G., and Co.* ... ..	886	0	0
Moreland and Son ... ..	695	0	0
Fawcett, Preston, and Co. ... ..	690	0	0

No. 4 contract—Charcoal plant:—			
Waller, G., and Co. ... ..	998	0	0

No. 5 contract—Lancashire boilers:—			
Fawcett, Preston, and Co. ... ..	2,290	0	0
Horton and Son ... ..	2,040	0	0
Thornewill and Warham ... ..	1,970	0	0

\* Error in estimate.

**BRIDGEWATER.**—For the erection of farm buildings and repairs to dwelling house at Heathfield, for the Right Hon. Viscount Portman. Mr. G. B. Jewell, Yeovil, architect:—

Properjohn and Townsend (accepted).

**CASTLE CAREY.**—For the erection of farm buildings at Higher Farm, Barrow, for the Right Hon. Viscount Portman. Mr. G. B. Jewell, Yeovil, architect:—

Collins (accepted).

**CARDIFF.**—For painting, decorating, &c., Heathfield House Convent. Mr. C. C. Jones, M.S.A., 44, Charles-street, Cardiff, architect:—

Turner and Sons, Cardiff (accepted).

**CREWKERNE.**—For the erection of farm buildings at Globe House, Hazlebury, for the Right Hon. Viscount Portman. Mr. G. B. Jewell, Yeovil, architect:—

Lye and Sons, Crewkerne (accepted).

**CREWKERNE.**—For new walls, &c., at Hazelbury Church, for the vicar and churchwardens. Mr. G. B. Jewell, Yeovil, architect:—

Lye and Sons, Crewkerne (accepted).

**ENFIELD.**—For the erection of a house in I Gordon-road, for Mr. Greenwood. Messrs. Searle, Ha and Bowyer, Tottenham, Enfield, and Cheshunt, architects and surveyors:—

Harrison and Crabb ... ..	£298	0	0
Coote ... ..	249	0	0
Monk ... ..	238	0	0
Smithers ... ..	178	10	0

**FLINTSHIRE AND CHESHIRE.**—For constructing Vyrnwy Aqueduct across the Wych Brook, forming boundary of the counties of Flint and Chester, for city council of Liverpool. Mr. Deacon, water engineer; Fotherby and Son (accepted at schedule of prices).

**FROME.**—For the erection of farmhouse, stable, & Huntley's Farm, Downhead, for the Right Hon. Viscount Portman. Mr. G. B. Jewell, M.S.A., Yeovil, architect:—

Francis and Son, Castle Carey (accepted).

**FROME.**—For the erection of house and offices at Farm, Downhead, for the Right Hon. Viscount Portman. Mr. G. B. Jewell, Yeovil, architect:—

Shire and Wilcox (accepted).

**HACKNEY.**—For rebuilding the Cat and Mutton Tavern and premises adjoining, London Fields, Hackney. Mr. A. Lewcock, 88, Bishopsgate street Within, E.C., architect:—

Spencer and Co. (accepted).

**HANLEY.**—For painting St. John's Market, for the council:—

Barlow, S. (accepted) ... .. £89 16

**HARDINGTON.**—For the erection of labourers' cottages for the Right Hon. Viscount Portman. Mr. G. B. Jewell, Yeovil, architect:—

Francis and Son, Castle Carey (accepted).

**HAWSTEAD.**—For monument in Hawstead Church, for Mr. W. Biddell, J.P. (Robin Hood stone and marble). Mr. J. S. Corder, architect:—

Grimwood, G., and Sons, Sudbury ... .. £60 0

**HORNSEY.**—For concrete footway pavements, for local board:—

	Per yard	
Torode, T. ... ..	7s.	
Jackson, F. A., and Son ... ..	6	
Wilson, A. E., and Co. ... ..	6	
Walker, A. ... ..	6	
Malcolm, Lacleed, and Co. ... ..	6	
Millar, W., and Co. ... ..	6	
Stuart's Granolithic Paving Co., Ltd. ... ..	6	
Patent Paving and Construction Co., Ltd. ... ..	5	
Homan, E. ... ..	5	
Patent Victoria Stone Co., Ltd. ... ..	5	
Grano-Metallic Paving Co., Ltd.* ... ..	5	
Mowlem, J., and Co. ... ..	4	
Imperial Stone Co., Ltd. ... ..	4	
Jones's Annealed Concrete Co. Ltd. ... ..	4	

\* Accepted.

## To Municipal Authorities, Engineers, and Surveyors.

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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1759.

FRIDAY, SEPTEMBER 21, 1888.

## SEASIDE RESORTS AND THEIR ARCHITECTURE.

THE projectors of new watering-places have scarcely entertained any other idea than drawing a number of holiday-making people to the seaside by amusements of a varied but very ephemeral nature. They imagine that a new pier, a pavilion for music, a few hotels, and a switchback railway are all that are necessary to equip an embryo seaside resort. A company is started with capital sufficient to set the place afloat. One or two hotels are erected facing the sea, and a plan is prepared and largely advertised by perspective views highly coloured, showing rows of neat villas, single and semi-detached; a church, of course with a lofty spire; a marine parade, tennis-grounds, and pavilions interspersed with ample gardens and foliage, and surrounded by a landscape of unequalled attractiveness. We can point to a very admirable and naturally favoured place not far from Southsea, in which all these attractions were shown by the early promoters, but which to this day is still half-finished, if it is ever destined to attain the popularity its salubrity deserves. On the Kentish coast more success has attended the starters of at least one new resort. We may name Westgate-on-Sea as a select suburb of Margate. A capital being subscribed, it has not been difficult to make a beginning by an enterprising company by the aid and patronage of a great landowner. Eastbourne, we know, has thriven from the local and moneyed interests which one great landlord has thrown into the scale. Other places do not appear—although possessing like natural advantages—to have gained the same popularity. It is from no lack of energy that they are comparatively little resorted to by the general public. They have been pushed, well advertised, and a fair stock of attractions have been provided. Why is it we find one resort declining and another not far distant rising in public estimation? The natural advantages and facilities of both are about equal as regards their distance from great commercial centres, and the means of communication to each are good. The answer must be looked for in the manner the new town has been laid out—in the general scheme of building, engineering, and architectural treatment. In several new watering-places we know the natural peculiarities have been entirely neglected; the physical features have scarcely been considered in the general laying out of the roads, terraces, and esplanades; they have been allowed to break out here and there with abruptness, and natural scenery and building have been brought into strange and violent contrasts. Skegness, on the coast of Lincolnshire, is one of those places where the modern builder has unmistakably set his stamp on the locality. Flatness is the prevailing character of Lincolnshire scenery, as all know who have visited the Fens. Nature has divested the country of all the features most favourable to a resort, save the fine seaboard that skirts the land to the eastward. The straight rows of houses which form the lines of the streets and terraces only partially erected add to the monotony and intensify the flatness and level lines. It did not occur to the designers that there was one way to produce a little diversity to the scene by avoiding straight lines on plan, and building the houses in curved lines and in crescents. The curves would have broken the straightness by varying the ground and

sky lines. Yet, not only in the plan of the streets has the straight line been introduced, but in the level roof-lines and continuous ridges, and so the evil has been rendered still more objectionable and disagreeable to the eye of the visitor. Nowhere do we observe the gabled or broken roof, which is the construction best suited to flat, plain-like localities. The parallel span roof abruptly terminates with gable ends. Then, in Skegness, all the buildings are of red brick, and of a hackneyed kind of architecture. There are very few houses in which any attempt is seen to give variety to the windows or the dressings. The balcony and bay window are inadequately treated. All is of the most commonplace character. The abrupt rows of houses leave unsightly gaps in the streets, rendering it impossible to follow out any plan of arrangement. The sea-front is thus patchy and disjointed; but there are some compensations for the dullness of the town, with its flat lands behind, where there are neither hedgerows nor trees, chimneys nor smoke, to break the horizon. There is the splendid pier constructed by a company in 1881, with its fine pavilion on the spacious head, rivalling in length even that of Brighton, and there is a magnificent sandy beach extending for miles along the sea. To the visitor these advantages do not altogether make up for the want of good planning and lack of rural surroundings which are so conspicuously noticed here. The building has spoiled the town irretrievably. The conclusion to be drawn is that the plan and conditions of building in new seaside towns have much to do with their success. Architectural conditions ought to have far more consideration than they usually have. We do not mean that it is necessary to have high class or even good architecture, that the houses should be either in this or that style; but only that the physical features and conformation of the locality should be studied with reference to the plan of the streets, and that in the design of the rows and terraces such features as roofs, and the materials to be used in the building, ought to be decided with special relation to the natural surroundings. Skegness might have been made more pleasing if the builders had been required to gable and hip their roofs, and if there had been a regulation that long, straight-eaved roofs of slate would not be tolerated, and that red brick must be varied by stone, white brickwork, or half timbering and stucco. Other towns take their example from what has been already done near them. Thus it is to be feared that the neighbouring watering-places of Sutton-on-Sea and Mablethorpe will be sacrificed to the intolerable cheap speculative builder style of straight-slatted roofs and red brick, if some one does not show that even a flat and uninteresting country can be made agreeable by its buildings.

Bournemouth has been spoiled by the red brick craze; but its undulations have happily prevented anything like uniformity in the buildings. Brighton has been marred in the newer western parts; but its undulating downs have compelled the builder to follow them. So with Clevedon. Westgate-on-Sea and Birchington indicate what can be done by tasteful villa building, and the avoidance of the straight, continuous line of buildings, a tendency which has spoiled nearly half our new seaside places, except where nature has made it impossible to be followed.

## LAND SURVEYING.—VIII.

### THEODOLITE SURVEYING.

HAVING explained the method of taking angles with the theodolite, it may be of service to the student if we show him the method of conducting the survey of a large district by means of that instrument and the chain. The preliminary proceeding is to

pole out the angles of the estate, those of the boundaries and roads, taking care that the poles can be seen from one station to the other. If there be any prominent feature in the centre of the land—such as a tree—reference to this object may be made in fixing upon any of the stations. We commence (plan 10) by chaining line 1 from the station A in the road, some distant object or tree being our guide. Before we proceed, the theodolite is planted on the station and put in adjustment, and an observation is taken to show the bearing of this line with the magnetic meridian. To do this the zero of the vernier and the 360° are set, and the upper part clamped, the needle is brought to 360° in box, the lower limb is clamped and the upper released, and the telescope is gently turned in the direction of the object, and the bearing recorded—say 25° west of north. Before proceeding with the chaining, it is useful to take another angle to any distant object. A large tree, which forms a centre object of the estate, is taken in this example, and the reading from line 1 to this object is 63°. From the same station turn the telescope to the flag or pole at end of line 14, and take another angle 58° with the last line. Having measured the angle at A, we may proceed with the chaining of lines 1 and 2. At the end of line 2 a good sight is obtained of the tree, and the theodolite is set up and the angle measured 91°. Angles may be measured also to line 8 and to line 3 before proceeding further. Lines 3, 4, and 5 are next chained. At the end of line 5 on the road a convenient point is obtained for taking two important angles. First, the angle between poles 5 and 6 may be measured (88°). Turning the telescope on pole at end of line 12 take the angle between it and the further tree, which reads 93°. Lines 6, 7, and 8 are next measured, taking up the fences, the boundaries of the land, and the winding of the river as we proceed. Between 7 and 8 in centre of road, the angle between these lines may be taken, also between them and the central tree, the angles measuring 92° and 74° respectively. This portion of the survey being so far completed, we return to station A, and proceed to chain lines 9, 10, and 11, chiefly along the roadway. Offsets taken at the ends of each chain line to the lines ranged to the tree, which pass on either side of the road, will enable its curvature to be plotted. The boundaries 12, 13, and 14 complete the outline, angles being taken to the tree at all convenient points, and between 13 and 14. The other lines to be chained will be observed by an attentive study of the plan. It will be noticed that there are four main triangles made by the radial lines to the centre tree, and that as the bases of these are measured and form the boundary lines, and two angles are taken to each, the other angle and sides can be plotted or calculated. At the upper corners of the plan, which is bounded by the brook, two other triangles can be formed by chaining lines, joining the extremities of the three upper radial lines, and by making one straight line instead of lines 1 and 2, a figure of an irregular hexagon will be formed which can be easily plotted and calculated. Taking the large triangle, of which one side is line 13, the angles taken at the ends 33° and 49° enable the position of the tree to be accurately determined; three things being known about the triangle, it can be solved in the way we have shown. But without calculation, the position of the tree can be found, for the intersection of the two sides will fix the point. The work can be proved easily by remembering that the sum of the two angles at the extremities of a chain line, subtracted from 180° will give the third or apex of triangle. By plotting the two angles accurately by a protractor, the third one should measure the reading in the field-book; if it does not do so one of the other angles must be wrong. In commencing to plot



the survey, lines 1, 2, 3, 14, and 13 should be laid off by the scale and protractor, taking care that the magnetic meridian is first drawn on the paper, and its angle correctly plotted with lines 1 and 14. The protractor used should be a large one; as we have said, 12in. diameter is not too large, as the angles can be more accurately pricked off.

Another method of surveying and plotting may be noticed. The boundary lines may be all taken in reference to the meridian, and the angles marked on the plan or field-book when chaining. For example, line 1 is  $25^\circ$  west of north, or  $335^\circ$ , line 14 is, say,  $95^\circ 30'$ , line 2 is  $10^\circ$  west, or  $350^\circ$ , line 3 is  $38^\circ$ , and so on. These angles are entered as we proceed. In plotting the survey circles can be described, as we explained in our last article, at each corner of the paper, and the chain lines can then be set out on them to the proper angles drawn through the centre of circle, and each line can then be drawn in parallel to its particular angle. For convenience parallel meridian lines can be drawn over the paper, and the chain lines are then more readily laid down. The smaller lines in the survey can be filled up by the aid of the sextant. In our plans we have avoided drawing too many tie lines which might be taken, those we have shown by the finer dotted lines being necessary in taking up the fences. Good tie lines would be the thick radial lines along the road, numbered 9 and 11, and line 16. The thick dotted lines on the plan show the radials to the centre object to which we have referred. It should be noticed that the main object of theodolite measuring is to avoid measuring chain lines through the ground; these are supposed to be difficult on account of obstructions. With a central object upon which angles can be measured from the boundaries, such through lines are not necessary. To prove the work the triangles can be calculated, or the sum of the interior angles taken. For this purpose all the chain lines and radials are first plotted from the field-book, the number, respective length, and angles being entered upon each, and if these are found to be correct, the fences, roads, and filling in can be drawn. The details of the survey ought not to be plotted till the main lines and boundaries are put in.

At the risk of tiring the student with the preliminary steps of taking angular measurements, we may refer again in a little more detail to the method of measuring the angles

station 3, and if the readings agree with the former, the angle between 1 and 3 may be assumed to be correct. To station 3 the instrument is then moved and put into adjustment. We here add  $180^\circ$  to the last bearing 2 to 3. Let us suppose this was  $30^\circ$ , then  $30^\circ + 180^\circ = 210^\circ$ . This addition is according to the rule, "If the original bearing is less than  $180^\circ$ , add  $180^\circ$  to it; but if more than  $180^\circ$ , subtract that sum from it for the back setting." Set the plates of instrument to  $210^\circ$ , and proceed as at station 2. In the same manner we proceed with the other stations of the traverse. Another method, though less expeditious, may be found by taking each angle separately. Placing the instrument on station 2, clamp the plates upon zero, and turn round telescope upon station 3, when the interior angle will measure  $114^\circ$ . Remove instrument to 3, clamp the plates upon zero, and read the interior angle, say,  $75^\circ$  to station 4. Proceed to station 4, and take the interior angle to 5, and so on. Thus it will be noticed the true bearing of any line will be found by adding to the original bearing the interior angle when a line bears to the left, and deducting the same when the line bears to the right. But this plan is open to the objection of being troublesome; besides which, the rule just stated may lead to inaccuracies in surveying a long traverse.

We have been reminded by a correspondent, with reference to our remarks on chain surveying of triangles, that no means are suggested for proving the accuracy of the lines of a triangle by taking tie-lines. Our readers will see by the observations we have made how essential it is to take as many tie or proof-lines as possible, and we therefore are glad to avail ourselves of our correspondent's remark that the field-book may record the length of the three sides of a

triangle, and yet, from a mistake in chaining one side, the plotting may be wrong. A mistake of one chain may be made, and there would be nothing to check it unless an angle were taken. But if a chain line be run across the triangle joining two sides at certain distances, and carefully noted, or from one angle to the opposite side, any discrepancy in the scaling discovered in the plotting of the tie-line will show an error has been made in measuring the sides. Therefore, the importance of taking a tie-line to every large triangle is obvious.

#### PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XI.

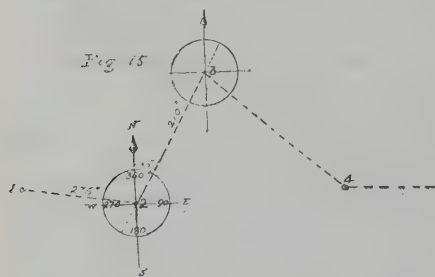
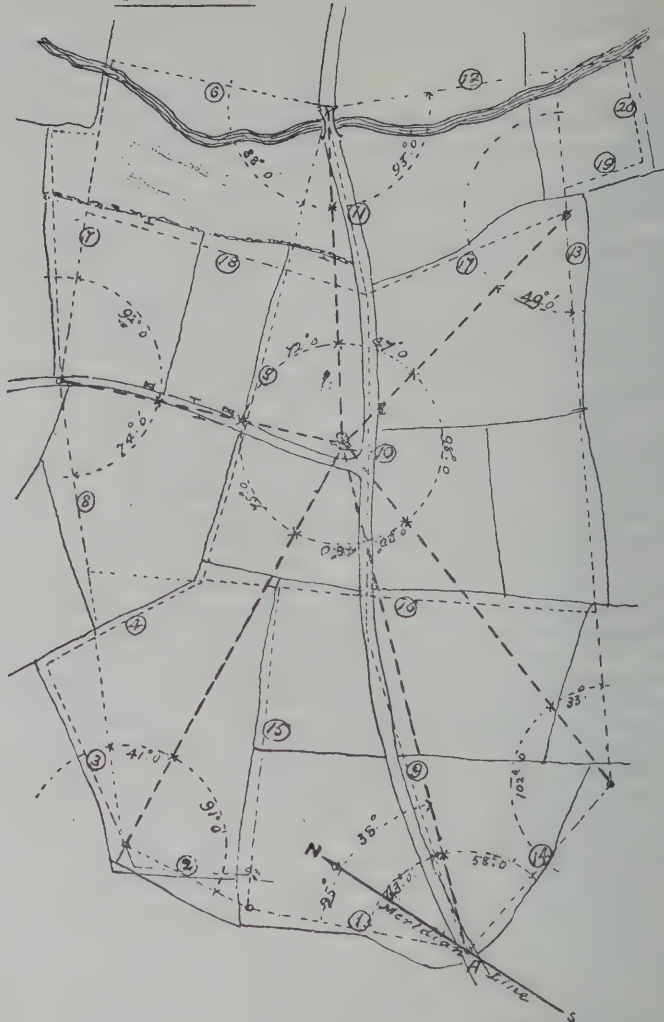
By HENRY LOVEGROVE, F.S.I., Surveyor.

REMAINDER OF CARPENTER.

(Sheet omitted by accident.)

53. **TIMBER.**—All timber to be Dantzic, Riga, or Memel yellow fir of the best description and free from all defects—sap, shakes, large or loose knots, and sawn die square. The deals to be yellow Christiania of best quality and well seasoned.
54. **Generally.**—Provide all necessary timbers for stays, struts, ties, shores, &c., that may be required, centring for arches, turning pieces, rules, templates, and moulds.
55. **Plates.**—All plates to be  $4\frac{1}{2}$ in. by 3in., in as long lengths as possible, and to be lapped and carefully spiked at angles.
56. **Lintels.**—All internal openings to have lintels 1in. in depth for every foot of opening, none being less than 3in. in depth and not less than 12in. longer than the opening, and as wide as practicable.
57. **Distances.**—No timber to be nearer than 3in. to any flue, and no rafters, joists, or other timbers to be more than 12in. apart.

PLAN 10



of such a boundary as we have shown. Referring to Fig. 15, let the bearing 2—1 be  $276^\circ$  with the true north be supposed to be given, we have to find the angle between it and line 2, 3. Clamping the upper and lower plates of the instrument—using the tangent screw—make the vernier read the bearing. Turning the instrument gently round till the telescope points to station 1, make sure of the observation by clamping the lower plate and bringing the cross hairs to the foot of pole by the tangent screw. Then, unclamping the upper plate, turn the telescope gently round to station 3, and adjust the hairs in the same manner, after clamping the upper plate. Repeat again the operation by directing the instrument to station 1 and then to



76. *Staircase into Garden*.—To be framed in deal as shown, put together in white-lead and pinned with oak pins. The arched boards to be 3in. thick, and the floor to be formed with 4½in. by 1½in. laths to form lattice floor, wrought all round and nailed with galvanised iron nails. The outside laths to be 8in. by 1½in. The steps to be 1½in. thick and 10in. wide, wrought all round and rounded on front edges, housed into 10in. by 2in., wrought all round string. The balusters to be 2in. square, framed at both ends and turned. Sills 6in. by 4in., posts 4½in. by 4½in., with ornamental termination. Upper sill of oak 4 by 2½, wrought all round, sunk, and chamfered both edges, 4 by 3 oak wrought, framed, and moulded handrail framed into posts, the posts to be terminated by oak balls 4½in. diameter.

77. *Conservatory*.—The floor of the conservatory is to be paved with 6in. red tiles, laid and jointed in cement on concrete 7in. thick, filled in between joists. Case in the bressummer with 1½in. deals, and form a ceiling over part with 1½in. deals, wrought, tongued, matched and V-jointed, boarding with 4 by 3 moulded cornice. The sill to be 8 by 4 oak, stop sunk, weathered and throated with 1½ by 1-16 galvanised iron tongue, fitted in grooves in the stone sill. The posts at ends to be 6in. by 6in. fir, wrought all round rebated and beaded, with 7 by 7 do. at angles, and 6 by 6, the remainder 6in. by 4in., transom, 12in. by 6in. head, 12in. by 3in. deal moulding planted on, and 8in. by 4in. moulding do. The side-lights to be 2½in. with extra wide bars, hung on 4in. butts, and fitted with Elsley's patent rack fastening. The top of conservatory to be framed as shown, the spandrel to be filled in with 2½in. deal fixed lights. The door from drawing-room to be 2in. deal, the lower part in one panel moulded both sides, the upper part sashed for glass with extra wide bars in small squares, the top rail segmental. The door to be hung with 4in. butts and fitted with 6in. lock and two 9in. brass barrel bolts, 5in. by 4in. frame for door, 4in. grounds, and 4in. architrave. The door to garden to be similar to last, with 2in. fixed fan-light over, and 4in. by 3in. transom.

78. *Staircases*.—The stairs from basement to ground-floor to have 1½in. treads, with rounded nosings, 1in. risers, tongued glued blocks, and bracketed on strong fir bearers. The windows to be cross-tongued, the bottom step nailed. Framed 1½in. wall, and outer strings ramped and tongued at joints 4in. by 4in., plain newel with ornamental tops. Mahogany handrail as shown, 1½in. by 1½in. turned balusters, ¾in. beaded apron lining, and rounded nosing to landing to match treads. The stairs from ground floor to second floor to have treads as last, but with moulded nosing tongued on under the bottom tread, and riser rounded and veneered 1½in. cross-tongued quarter spaces on strong fir bearers; 1½in. framed and moulded wall strings with skirtings on landings to match, the outer string to be 1½in. rebated and moulded, capping and moulding planted on face, as detail; ¾in. apron lining with moulding planted on to match string; 1½in. moulded nosing and moulding under to match treads. Mahogany handrail as detail, 2in. by 2in. turned balusters; 4in. by 4in. newels, with ornamental top and pendants as shown. The spandrel framing to be 2in. moulded and square.

79. *Servery*.—The framing to servery to be 2in. moulded both sides two panels high with 2in. spandrel sash over. The door to be 2in. with diminished stiles, the lower part in two panels moulded both sides, the upper part sashed with stout bars in small squares hung with 4in. butts and fitted with 6in. brass mortise lock, black and brass furniture and finger-plates. The light over to be 2in. moulded, the framing to be formed with posts (see detail) properly framed and

studded to floor with transom moulding planted on (see drawing).

## FOUNDER AND SMITH.

80. *Eaves Gutters*.—All the roofs to have 5in. moulded heavy cast-iron eaves gutter, with red-lead joints on brackets and screwed to fascia. To have all necessary stopped ends, outlets, and angles.
81. *Down-pipes*.—All rainwater pipes to be 3½in. by 2½in. rectangular, with collars cast on and jointed with red-lead and tow, and securely fixed to brickwork. To have all necessary shoes, plinth, and other beads, and swan-necks.
82. *Grates*.—In the kitchen provide a kitchener with oven and high-pressure boiler £15 p.c., in the scullery a range £5 p.c., in the three reception-rooms to average £5 p.c., in two other rooms £1 each p.c., and the remainder 10s. each p.c.
83. *Chimney Bars*.—All chimney openings to have 2 by ½ wrought-iron chimney bars 18in. longer than the openings, the ends split and turned up and down.
84. *Handrail, &c.*—The steps to side entrance to have wrought-iron framed handrail and balusters.
85. *Girder*.—The girder to carry wall over dining-room to be of two rolled joists weighing 57lb. per foot run each.
86. *Bolts*.—Provide 2cwt. of straps and bolts to be used by the carpenter as will be directed.
87. *Coal-shoot*.—Provide and fix a frame and hopper for coal-shoot 1ft. 9in. by 3ft. 3in.
88. *Bells*.—Provide the sum of £15 for electric bells and fixing, including presses and indicators.
89. *Gas*.—Provide the sum of £20 for gas-pipes and fittings.

## FOUNDER AND SMITH.

The iron to be the best Staffordshire or equal thereto, and all castings to be smooth and perfect:—  
CAST IRON AND FIXING.

- 127ft. Run, 5in. moulded heavy eaves gutter, with proper lead joints on brackets, and screwing to fascia ..... £ s. d.  
No. 12 extra to stopped ends to do. ....  
5 " outlets do. ....  
2 " external angles do. ....  
1 " internal do. do. ....  
6 " obtuse do. do. ....  
158 " 3½in. by 2½in. rectangular rainwater pipe, with collars cast on, jointed watertight with red-lead and tow, and securely nailing to brickwork .....  
No. 5 moulded heads .....  
2 Extra to plinth bend in do. ....  
5 " to swan-neck do. ....  
5 shoes (purpose made about 30in. long) .....  
No. 4 register grates p.c. 10s. each and allow for profit and carriage .....  
No. 2 do. p.c. 20s. each and do. do. ....  
No. 3 do. with fire-brick backs and sides and tiles in front, p.c. £5 each and do. do. ....  
No. 1 range p.c. £5 and do. do. ....  
No. 1 kitchener with oven and high-pressure boiler, p.c. £15, and do. do. ....

## WROUGHT IRON AND FIXING.

- Cwt. qr. lb.  
1 1 7 In chimney bars with ends split and turned up and down and building in by bricklayer .....  
5 2 7 In framed balusters and newels .....  
15 3 Do. rolled iron joists and hoisting and fixing at about 12ft. from ground level .....  
2 Do. straps and bolts and fixing by carpenter to be used as directed (provisional) .....  
No. 1 frame and hopper for coal shoot 1ft. 9in. by 3ft. 3in. and building into wall .....  
Provide the sum of £15 for electric bells .....  
do do. £20 for gas-pipes and fittings .....  
Allow for attendance on bellhanger and gasfitter .....

## BELLHANGER AND GASFITTER.

Carried to summary ...

## PLASTERER.

90. *Materials*.—The whole of the plastering to be executed with the best flare-burnt chalk lime, clean, sharp sand, clean, long cowhair free from grease, and Baltic heart-of-fir laths of the quality known as lath and half, the ends to be butted, not lapped.
91. *Limewhite*.—Twice limewhite the whole of the basement walls which are not plastered; also soffits of arches and stone steps.
92. *Walls*.—Render, float, and set the walls of the breakfast-room, passage in base-

ment, and the whole of the walls and brick partitions on upper floors.

93. *Partitions*.—Lath, plaster, float, and set the partitions throughout.
94. *Ceilings*.—Lath, plaster, float, set, and twice whiten ceilings throughout; also soffits of internal staircases.
95. *Cornices*.—Run plaster-moulded cornices to design, and whiten to the rooms as follows: First floor rooms, 12in. girt; dining and drawing rooms, 24in. girt; library, 18in. girt; porch, bay window, and cloaks, 9in. girt; breakfast-room, 12in. girt; entrance hall, &c., 21in. girt.
96. *Portland Cement*.—The whole of basement, except where wood skirtings are described, to have beaded skirtings 6in. high.
97. *Keene's Cement*.—The internal arches, as shown, to be finished in Keene's cement, the angles, 1½in. diameter, staff beaded, the architraves 4in. and 4½in. respectively.

## PLASTERER.

Use the best flare burnt chalk lime, clean sharp river or pit sand, clean long cowhair free from grease, and Baltic heart of fir "lath and half" laths:—  
Yds. Ft. £ s. d.

- 379 Supl. Twice distemper plastered walls a plain tint, the colour fixed ...  
122 " Extra to fair face and twice lime-white brickwork .....  
3 " Do. do. point and twice lime-white soffit of arch .....  
4 " Clean down and twice limewhite soffit of stone steps .....  
1,208 " Render, float, and set walls .....  
55 " Do. do. narrow to circular soffit .....  
218 " Lath, plaster, float, and set partitions .....  
542 " Lath, plaster, float, set, and twice white ceilings .....  
17 " As last on soffits of stairs, a small part fueling .....  
30 Run. Labour to quirk .....  
26 " Plaster moulded cornice, 6in. girt, and twice white .....  
66 " Do. 9in. girt and do. ....  
57 " Do. 12in. do. and do. ....  
272 " Do. 18in. do. and do. ....  
113 " Do. 21in. do. and do. ....  
177 " Do. 24in. do. and do. ....  
No. 79 internal mitres to do., average 18in. girt .....  
7 external do. do. 19in. do. ....  
6 obtuse do. 6in. girt .....  
1 stopped end to do. 21in. do. ....  
1 mitred returned to do. do. ....

## PORTLAND CEMENT.

- 11 Supl. Plain face on lath in panel .....  
118 Run. Beaded skirting 6in. high on brick No. 24 angles to do. ....  
8 housings " .....  
2 scribbings " .....

## KEENE'S CEMENT.

- 139 Supl. Plain face to jambs in narrow widths 6in. do. circular to soffit do. ....  
147 Run. Angle and aris .....  
46 " do. circular .....  
83 " Rounded angle .....  
No. 13 stopped ends to do. ....  
7 " 1½in. staff-beaded angle and double quirks .....  
22 " Do. circular .....  
No. 3 stopped ends to do. ....  
3 played do. do. ....  
58 " Moulded architrave 4in. wide .....  
65 " do. circular .....  
No. 10 stopped ends to do. ....  
4 mitres circular to circular .....  
52 " As last 4½in. wide .....  
49 " Do. circular .....  
No. 6 stopped ends to do. ....  
2 mitres do. ....  
2 square plinth blocks 18in. high, 5in. wide, and dubbing out for same. ....

Carried to summary .....

## PLUMBER (EXTERNAL).

98. *Lead*.—The lead to be the best milled lead, with all necessary tacks, wall hooks, and lead-headed nails.
99. *Gutters*.—The gutters throughout to be laid with 6lb. milled lead.
100. *Flashings*.—The flashings to be of 5lb. lead, to average not less than 5in. width, and step flashings not less than 12in. wide.

## PLUMBER (INTERNAL).

101. *Service*.—Lay on the water from the main with ½in. lead pipe, ¾in. brass driving ferrule to the cisterns. The cisterns are to be fitted with ¾in. brass ball valve and copper ball, all necessary brass unions, and 1½in. overflow.
102. *Cisterns*.—Provide and fix on strong bearers two wrought-iron galvanised cisterns, each to contain 200 gallons, one to supply the hot-water cistern and



water for drinking purposes, the other for w.c.'s, &c.

103. *Supply*.—Lay on the water from the above cisterns with  $\frac{3}{4}$  in. pipes, and  $\frac{1}{2}$  in. branches to the water-waste preventers, and  $1\frac{1}{2}$  in. pipes from these to the w.c. pans.
104. *W.C.'s*.—The two best w.c.'s to be Doulton's patent valve closet, £5 p.c., and the servants' w.c. to be £3 p.c., with 4 in. lead pipes from pan through walls to 4 in. diameter cast-iron soil-pipe, with socket joints caulked with red-lead and tow, and securely fixed, the pipe to be carried up above roof, and finished with Boyle's foul-air extractor.
105. *Safes*.—Form safe to the w.c.'s of 4 lb. lead and to bath of 5 lb. lead, with bossed angles and brass gratings.
106. *Bath*.—The bath to be of enamelled iron £5 p.c., including brass fittings, hot, cold, and waste 2 in. lead waste.
107. *Sinks*.—The scullery sink to be 3 ft. 6 in. by 2 ft. on two half-brick bearers, and the housemaid's sink to be p.c. 34s. in Doulton's list. Both to have  $\frac{3}{4}$  in. screw-down bib cocks for cold-water supply, and 2 in. lead wastes.
108. *Hot Water*.—Provide and fix in the roof as will be directed a wrought-iron galvanised hot-water cistern to contain 70 gallons, and connect with cold cistern with a short length of  $\frac{3}{4}$  in. lead pipe. The flow and return from cistern to boiler of kitchen to be 1 in. wrought iron, with all necessary joints, bends, and elbows (and painted four coats). Carry the water from the hot cistern with  $\frac{3}{4}$  in. pipe, and  $\frac{3}{4}$  in. brass hot-water taps over both sinks, and for draw-off in kitchen. Attend upon and cut away for the hot-water engineer.

PLUMBER.

Use the best milled lead dressed smooth, and include for hooks and all labour .....

- Cwt. qr. lb.
- 17 3 14 Milled lead and labour in gutters, flashings, &c., on roofs .....
- 0 2 0 Do. do. bossing to apex of octagonal knob .....
- 5 Run. Extra labour dressing 5 lb. lead over edge of flat .....
- 25 " Close copper nailing .....
- No. 1 bossed end to roll .....
- 3 soldered dots and screws .....
- 8 lead tacks and nails .....

WATER SUPPLY, &C.

The whole of the water supply to be executed in accordance with the Waterworks Company's Regulations .....

Give notice to the Authorities and Water Company and pay all fees legally demanded .....

Allow for taking up ground in road and tapping Company's main, and make good work disturbed .....

N.B.—The price for pipes to include all soldered joints except branch joints, which are taken separately .....

Cwt. qr. lb.

1 3 7 Milled lead labour in safe .....

- Ft.
- 25 Run. Close copper nailing .....
- No. 4 bossed angles to safe .....
- 156 "  $\frac{3}{4}$  in. strong lead service pipe, including bends, hooks, joints, and fixing .....
- 21 "  $1\frac{1}{2}$  in. do. do. .....
- 30 "  $\frac{3}{4}$  in. do. do. and digging trench for same and filling in, ramming, and levelling .....
- 17 " 2 in. lead waste-pipe, all as first .....
- 52 " 4 in. diameter cast-iron soil-pipe with socket joints throughout, caulked with red lead and tow, and securely fixed with proper wall hooks .....
- No. 2 soldered stopped ends to  $\frac{3}{4}$  in. pipe .....
- 6 do. branch joints to do. .....
- 2 pieces of  $\frac{3}{4}$  in. lead pipe about 2 ft. 6 in. long to supply water-waste preventer, including soldered joint to supply from cistern .....
- 1 do. about 8 ft. long, all as last .....
- 1 piece  $\frac{3}{4}$  in. lead pipe about 18 in. long, with one soldered joint to sink .....
- 2 do.  $1\frac{1}{2}$  in. do. about 6 ft. long for overflow .....
- 3 do. 4 in. pipe out of 7 lb. lead, about 4 ft. long, one end jointed to w.c. apparatus, the other to cast-iron soil pipe .....
- 1 3 in. brass grating and soldering to lead safe .....
- 2 in. " driving ferrule joint and fixing .....
- 2 in. " screw-down bib cocks do. and do. .....
- 2 in. " high pressure ball valves and copper balls to do. .....
- 2 in. brass stop-cocks do. and do. .....
- 2 in. " fly nuts and unions do. and do. .....
- 2 in. " do. do. do. .....
- 1 Boyle's patent foul air extractor, fixed to 4 in. pipe .....
- 1 iron collar as flashing to  $\frac{3}{4}$  in. pipe .....
- 2 galvanised wrought iron cisterns to contain 200 gallons, and fixing on and including proper bearers in roof where directed .....
- 2 Drilling holes in do. for  $\frac{3}{4}$  in. pipe .....
- 3 do. do.  $1\frac{1}{2}$  in. pipe .....
- 2 Doulton's valve closet, p.c. £5 each, and fixing .....
- 1 do. plain stoneware with water-waste preventer, and deal seat, price £3, and do. ...

- 1 enamelled iron bath, p.c. £5, including brass fittings, hot, cold, and waste, and fixing ...
- 1 glazed stoneware slopsink p.c. 34s. and allow for fixing same .....
- 1 Do. do. sink 3 ft. 6 in. by 2 ft., and fixing with back edge cut and pinned into wall and two half-brick bearers .....

- Ft.
- 39 Run.  $\frac{3}{4}$  in. wrought-iron pipe, including all joints, bends, elbows, short pieces, connectors, &c., complete, and fixing .....
- 138 " 1 in. do. all as do. ....
- No. 1 galvanised wrought-iron hot water cistern to contain 70 gallons and fixing on and including proper bearers in roof where directed .....
- 1 piece of  $\frac{3}{4}$  in. lead pipe to connect hot water cistern with cold .....
- 2 holes through iron cistern for  $\frac{3}{4}$  in. pipe .....
- 2  $\frac{3}{4}$  in. brass fly nuts and unions and fixing .....
- 3  $\frac{3}{4}$  in. do. hot water taps with label "hot" and fixing .....
- 2 connecting 1 in. wrought iron pipe with iron cistern, including holes and proper connections .....
- 2 do. do. with high-pressure boiler and do. do. ....
- Allow for attending upon and cutting away for hot water engineer .....

Carried to summary ...

GLAZIER.

109. *Plate Glass*.—The glass to be of the best description, well puttied, and back-puttied. The windows of best rooms to be glazed with best British polished plate, the upper lights, where shown to be of lead quarry glazing, 2s. per foot super. p.c. glazed. The doors to be glazed with 32oz. flatted sheet, except that near dust-bin, which is to be of 26oz. matted sheet. All other glass to be 21oz. flatted sheet.

GLAZIER.

The glass to be of the best description, securely sprigged and puttied:—

- Ft. £ s. d.
- 322 Supl. 21oz. flatted sheet glass and glazing in small squares .....
- 17 " Do. flatted do. do. ....
- 4 " 26oz. matted sheet glass in wash leather, in door panels in one square .....
- 63 " 32oz. flatted sheet glass and glazing in door panels as last .....
- 7 " Do. in one square .....
- 5 Run. Raking, cutting, and risk on do. ....
- 8 " Circular do. do. ....
- 124 Supl. Best British polished plate glass and glazing in small squares .....
- 12 Run. Circular cutting and risk on do. ....
- 98 Supl. Lead lights and glass, price 2s. per foot, including fixing .....
- Leave glass clean and perfect .....

Carried to summary .....

PAINTER.

110. *Materials*.—The paint to be composed of the best old white-lead, pure linseed oil, turpentine, &c. The work to be properly prepared and rubbed down between each coat, the finishing coat being such plain tints as the architect may direct.

111. *Ironwork*.—All ironwork to be painted four coats.

112. *Woodwork*.—The whole of the joinery throughout to be properly knotted, primed, stopped, prepared, and painted three coats.

NOTE.—The decorations, such as finishing of painting, paperhanging, also the boundary walls, have not been dealt with in the preceding specification and quantities.

PAINTER.

Use the best old white lead, pure linseed oil, turpentine, &c., for compounding the paint, properly prepare the work, and rub down between each coat and finish such tints as the architect may direct.

The varnish to be the best hard-drying copal.

- Yds. ft.
- 63 Supl. Paint four oils on iron .....
- 210 Run. Bar .....
- 177 " Small iron pipe .....
- 210 " Rainwater and soil .....
- No. 5 heads .....
- 5 swan-necks .....
- 127 " Eaves gutter in and out .....
- No. 1 frame and hopper for coal shoot .....
- 1 Boyle's extractor .....
- 425 Supl. Knot, prime, stop, and paint three coats on wood .....
- 250 Run. Frame one side .....
- 32 " Pipe casing .....
- 1232 " Skirting .....
- No. 76 frames one side .....
- 4 two light do. do. ....
- 10 three do. do. ....
- 81 dozen small sash squares do. ...
- 1 " large do. ....
- 26 casements one side .....
- 92 ends of timbers .....
- 10 chimney pieces (see Mason's bill) .....
- 33 Supl. Paint four oils on cement .....

Carried to summary ...

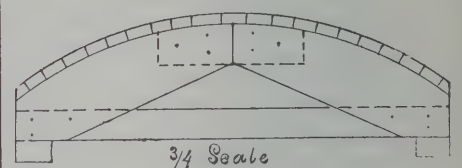
[NOTE.—The next subject treated will be very interesting and original.]

## CARPENTRY AND JOINERY.—II.\*

CENTRE AND CENTRING.

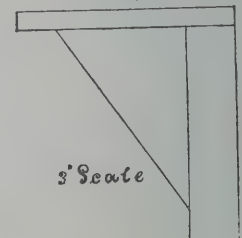
BEFORE the bricklayer can arch over an opening—he is for a doorway, window, or other purpose—he usually requires the aid of the carpenter to make and set up centres upon which to "turn" the arches. It is quite true that bricklayers build centres of bricks, resting upon a plank or board, supported by upright pieces. The usual course, however, is for the carpenter to make centres to the required shape, and when the bricklayer is ready, "set" them for him. Centres are usually made of rough slabs, cut from the outside of logs, cut and worked to the required shape (often just from the "band-saw"), then nailed together and sparred across. The usual forms required are—the segmental, semicircular, Gothic, and elliptic. The method of proceeding is to lay down upon a drawing-board the required curve—say a segment—and, in order to do so, there is required the radius of the circle of which it is a segment, or other means. The following

Fig. 8



rule will serve to find the length of lath required to describe any segment. Divide the square of half the chord (span) by the height of the arc (rise of arch), to the quotient add the height of the arc, and the sum will be the diameter or twice the radius. As, for example, an opening of 4 ft. is to have a segmental arch of 9 in. rise— $24 \times 24 = 576 \div 9 = 64 + 9 = 73 \div 2 = 36\frac{1}{2}$ , or 3 ft. 0  $\frac{1}{2}$  in. This length of lath would be handy to use. Having described the curve and parallel to and  $\frac{3}{4}$  in. within it, another for spars to be nailed across ribs, allow as much space from the springing (that is, from where the curve starts from the vertical line as seen in Fig. 8), as is necessary according to weight of brick or other material of which the arch is to be built; draw a horizontal line, and you are ready. Select the slabs; if the rise is not too much, a slab of sufficient breadth may be readily got; but if not, join as shown. Make

Fig. 9



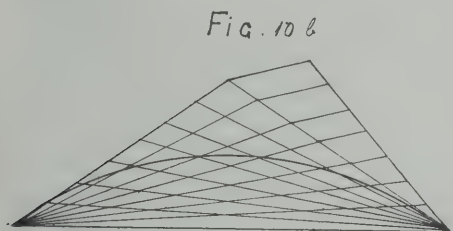
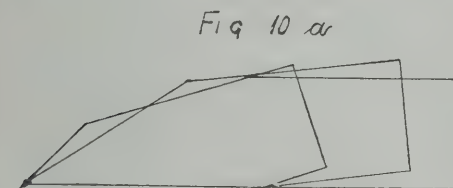
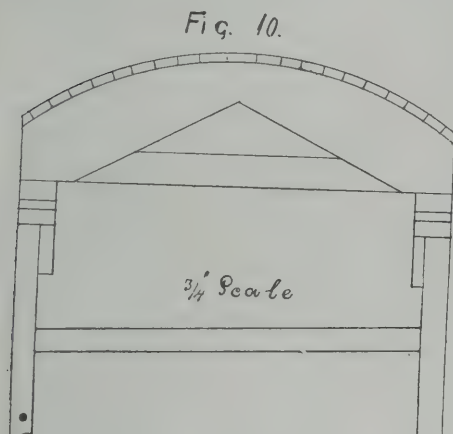
two ribs to drawing (sometimes a single rib with a piece bent round and supported by angle blocks as seen in diagram 9 will suffice, say, for a half-brick arch, or with a "reveal" and internal arch), then get out two pretty strong pieces to nail across underneath ribs, as seen in diagram 8. In nailing on spars round the curve, project them, say,  $\frac{3}{4}$  in. each side beyond rib. Nail these pieces on firmly, and in such way that the two ribs will be square and parallel in plan. In making ribs, nail any pieces which may be required to keep them together on the inside. Now nail on the spars, which may be from  $1\frac{1}{2}$  in. to  $2\frac{1}{2}$  in. broad, according to the quickness of the curve, and the centre is ready for setting up. The setting up is done by placing two uprights, one on each side, with a piece nailed on the top of each at right angles, if necessary, and one or two pieces jammed between them, as shown in Fig. 10.

The centre requires to be set level, which

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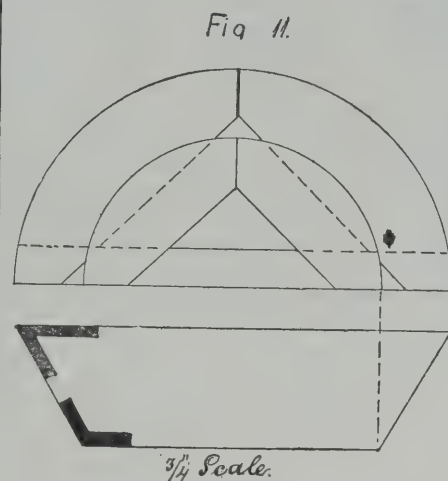
may the more readily be done by inserting wedges (one being driven from each side) between the pieces nailed across ribs below centre and those on the top of uprights supporting centre. These wedges will serve an additional purpose. When it is required to remove the centre, after the arch is completed drive out these wedges, which will not so rudely shake the building, nor disturb the bond of the not yet firmly set arch. Another



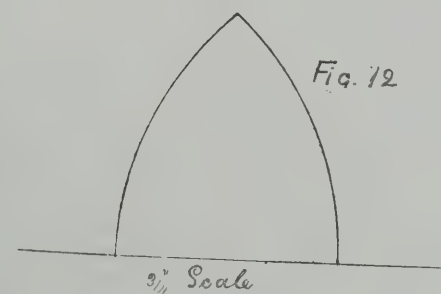
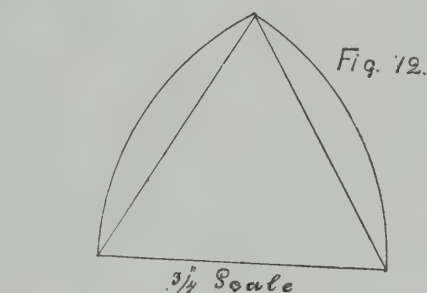
method for segments of slight rise and moderately wide span is shown in diagram 10a. The working of this is by taking a piece of board of a length equal to the width of the span, having one edge straight, breadth at least equal to the rise of arch, square a line across the centre, which gives half the width of the span, then from the straight edge at one end mark off the rise the segment is to have, saw off and plane to a straight edge, then put in three nails, one at the rise, and one at each end of width; keep the pencil at the angle, and travel the piece against the nails, tracing with the pencil one-half of the curve; reverse the piece and trace the other half by repeating the process.

Another method is shown in diagram 10b, which is by the intersection of lines; take twice the rise and connect this point with the extremities of the span, then divide these lines each into an equal number of parts, and from the extremities draw lines to each of these points; then trace the segmental curve through the intersecting points thus obtained (the auxiliary line is seen on the right-hand side, which is used to get the parts into which the two sides of the triangle are divided). Centres require to be made for "splayed jambs" which present very little extra difficulty. Take the case of a semicircular headed window or door opening when the splay is to be continued round. A plan would be required of splays and width between jambs, as shown in diagram 11, and then two ribs would be required to be got out of different sizes, as seen in the diagram, one bevelled outwards and the other bevelled inwards from the face of the ribs (bevels seen on left-hand side of plan in diagram). The radii of the semicircles are obtained from the plan (see diagram) as also bevels. When the ribs

have been prepared, nail pieces across underneath as before described, allow spars for top, a little long (the nett length being equal to breadth of splay), and cut them off to the outline and bevel when nailed on, or take exact



length and bevels from plan and cut before putting on. They should be taper, as also the space between them, as may be easily seen on account of the ribs differing in size. This class of centres (splayed jambs) is frequently required in church work. To support a "reveal" an attachment might be made to the centre as shown in diagram 9. Gothic centres present no further difficulty when the lines of the arch are laid down on the drawing-board. Two

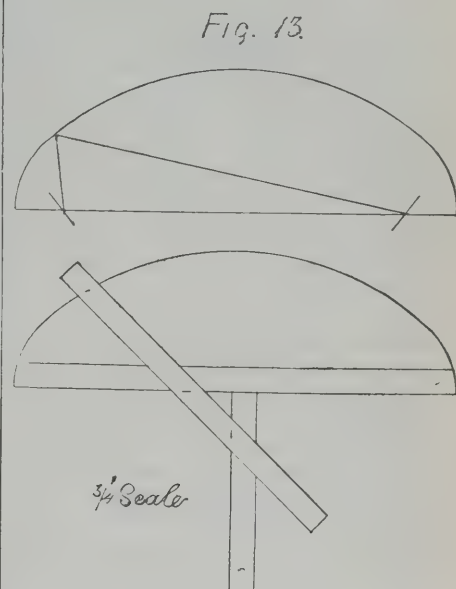


different kinds of Gothic arches are shown in diagram 12.

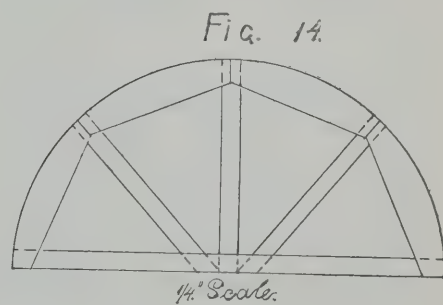
The common Gothic is based upon the equilateral triangle, and the distance between the angles is taken as the radius with which to describe the arch, and the point of meeting of the two arcs is at the third angle. The lancet arch is described by dividing the span equally, and from this centre point with a distance equal to the span, mark off on the springing line continued points, and from these points describe the arch; that is, the radius is equal to the span and half span.

The elliptic arch may be set out in several ways. The span of this arch would be termed its major axis, and the rise its semi-minor axis. Take the half span, and from the extremity of the rise intersect the span line on each side; these points would be called the foci of the ellipse, and serve as points in which to drive nails, a third nail being put in at the extremity of the rise; round these three nails stretch a piece of wire or string, fastening it when it encircles

the three nails; take away the nail at the rise, and with a pencil inside, and the wire or cord stretched to its full extent, describe the curve as seen in diagram 13. Or nail a lath having a



straight-edge along the springing line, and on the side towards the arch, another down on one side of the centre line, drawn at right angles to the springing lines. Now provide a lath a little longer than half the span, with one end at the extremity of the span; put a "bradawl" through the lath at half the span. Now put the same end to the extremity of the rise, and put another bradawl through the lath at the distance of the rise; start at the springing, and with a pencil at the end of the lath and the bradawls travelling against the laths nailed down for guides, describe half the arch; change the lath which was nailed at right angles to that along the springing line, and trace the other half of the arch; this is shown in the second figure of diagram 13. In every case when the curve of the arch is drawn, draw a line  $\frac{1}{4}$  in. within and parallel to it, which is the line to which the ribs forming the centre are made, the  $\frac{1}{4}$  in. being allowed for the spars which are nailed round and upon the ribs. In



making very large centres, very strong straps or girders are required to tie the ribs together at the proper span, and from these to the ribs are stays or braces, which serve to distribute the pressure; this is shown in diagram 14.

The second portion of the Exchange Station at Liverpool of the Lancashire and Yorkshire Railway has been completed this week. Half a million of money has been expended in the works now brought to a close, the chief portion of the heavy outlay being for the ten acres of miserable property removed to make room for the enlarged station, which has ten platform faces, each 200 yards in length. Over the entrance in Tithebarn-street has been erected an hotel, Italian in style, at a cost for erection and furnishing of £140,000.

The corner-stones of an extension of and addition to the Primitive Methodist Sunday School in South-street, Huddersfield, were laid on Saturday afternoon. From plans by Messrs. Abbey and Hanson, of Huddersfield, the old school will be enlarged, and an additional building will be erected at a cost of £500.



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## ILLUSTRATIONS.

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WARING COLLECTION AT BETHNAL GREEN.—SKETCHES  
OF DECORATIVE FURNITURE.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

SKETCHES IN LUDLOW TOWN AND  
NEIGHBOURHOOD.

SHROPSHIRE, like Cheshire, is justly celebrated for its rich examples of half-timber architecture, and few parts of the county are of more note in this respect than Ludlow and its neighbourhood. The week before last we printed some drawings of Stokesay Castle, which ranks as the most interesting house in the district; and to-day we are enabled to publish some admirable sketches of six other specimens of Shropshire woodwork illustrative of the same type of buildings. These drawings, from the pencil of Mr. Oliver Baker, who is a distinguished member of the Royal Society of Painter-Etchers, have been lent us by Mr. G. Woolley, of the Bull Ring, Ludlow, from the first-rate book which he has just published under the above title. Guide-books, as usually compiled, are at best but unsatisfactory aids to the architectural tourist, and the more ponderous volumes of county histories frequently furnish less reliable information about the buildings they describe, while page after page is often occupied by tedious antiquarian matter, or long genealogical accounts of no interest whatever to the general reader. The publisher of Mr. Oliver Baker's work about Ludlow has taken a new departure from the ordinary style of topographical books, and the author has very ably realised the promoter's intentions, avoiding tedious repetitions concerning historical particulars and discarding bulky reproductions of charters, deeds, and churchwardens' accounts, has more usefully occupied the space at his disposal by describing his personal examinations of existing buildings, thus furnishing the exact kind of information most necessary to those who wish to study the actual remains which can be seen now, and thus to learn how best to see them. Accompanying his descriptions are numerous plans and maps, while most of the places of importance are graphically represented in the manner of those instances which we have reproduced to-day as specimens of the remainder. Ludlow Castle is the point to which the stranger naturally first directs his attention, and probably the earliest glimpse which he will obtain of that historic ruin will be when reaching the open square where the old red market-house stands: he sees its high, outer walls and nail-studded gate among the tall elms which now fill up the moat of Roger de Lacy's stronghold. The long series of brilliant events which make up the history of the place from the obscurity of its original foundation to the days of the popular ferment which preceded the Revolution of 1688, furnish many an important record associated with great men whose names are linked with its varying fortunes. The Norman Keep, which rises on the far side

of the inner moat, forms the chief attraction to the visitor, together with the Elizabethan bridge and gables, built by Sir Henry Sydney, adjoining the ancient tower. The circular nave of the chapel is an exquisite example of 12th century art, and one of the few of that shape now remaining. The walls inside are enriched by an arcade of 14 arches, and the chancel arch of three orders is profusely elaborated with typical ornaments of the style. The group of the castle ruins supply an extremely interesting plan. The magnificent collegiate church at Ludlow is set off by the old houses which surround it, while over all soars the great belfry tower, weatherbeaten and grim, with time-worn traceries and sculptured niches. Inside this great parish church are many monuments and some rich screens and stalls with many a grotesque miserere carving and curious sculpture. The chapels, too, deserve mention, and had we the space the building would demand a more lengthy description, such as Mr. Baker has devoted to it. The monasteries, the college, the grammar school, Barnaby House—once a resting place for Mediaeval pilgrims on their way to St. Winifred's Well at Holywell, in Wales—Dinham Chapel, the town wall, Broadgate, the Butter Cross and Domestic architecture of the town, furnish the subject matter for his next chapter. The Feathers' Hotel, of which a sketch is here given, is well known as one of the best houses of its type in the country. Its exterior is not likely to be passed by without a visit to the interior, which is equally good and interesting, with some particularly beautiful plaster ceilings (R.I.B.A. "Transactions," Vol. III., new series, plate 36). In the coffee-room the ceiling is divided by moulded beams into three compartments, which are most elaborately wrought and filled with intricate ornament. The carved-oak mantelpiece is said to have come from the castle; but whether this was so or not, it harmonises admirably with the beautiful panelling and rich ceiling of its present quarters. Its most prominent feature is the royal coat of arms with the letters I. R. for Jacobus Rex, with bold arches and pilasters flanked by grotesque figures on each side. The adjoining room has good panelling, and the Foxe arms on a carved panel over the door. There is a tradition that one Jones built the house, which may account for the initials R. I. on the picturesque lock-plate of the front door. There were several similar half-timbered houses in Ludlow, though most of them are now plastered over; but in the churchyard the Reader's house deserves mention. The old Butchers' row at the top of Broad-street contains some good work still, and there are some fine old houses in Church-street with carved panelling. In High-street is a fine and elaborate ceiling of the time of Queen Anne. In the Bull Ring is a barge-board carved to represent a hunting scene, and there are one or two good houses, including a fine one in Dinham and a few at the lower end of Corve-street. At the corner of Frog-lane is a timber and plaster almshouse built by Thomas Lane in 1674, of good form and colour. The Foxe almshouse is a long, low building in stone, dated 1593. The Old Bell at Ludford, and the Porch and Oratory at Ludford House, furnish the subjects of two other of the sketches on our lithographic plate. Ludford House, which seems to have an early history, is a very large one, built round a quadrangle, and is chiefly of timber and plaster of the Tudor period; but some of it facing the churchyard is constructed on earlier walls of great thickness. The side towards the road, in which occurs the principal entrance under a pointed arch, is chiefly of rubble masonry, and rather heavy and gloomy-looking. In the older portions there is more variety, and the side overlooking the church is eminently picturesque, with several bold projections and fine groups of chimneys. In one of the former is the oratory seen in our view. The interior of the house has been, of course, modernised in parts, but it still contains some panelled rooms of good character, and much old furniture. Below the churchyard at Ludford is the ancient almshouse of St. Giles, with its long line of roof picturesquely broken by three simple stone gables and quaint chimney stacks. The Court House and Dovecote at Richard's Castle, and the Druid's Oaks in Oakley Park seem, too, worth visiting. The walk through the last-named place leads to

Bromfield, where the Priory will well repay examination. The situation of this monastery was delightful, and the gate-house still standing marks one side of the triangular inclosure in which the buildings were erected. The church remains nearly entire, with its tower of three stages in the earliest phase of Early English work. The gate-house, of which a view from the road is here given, is a building of two stories, the lower of solid Early English masonry, with a wide and heavy arch through the centre, flanked by buttresses, and the upper of timber, now restored and used as a school-room. Wigmore is another place near Ludlow to which Mr. Baker guides his readers, giving them a full account of the castle, church, and village, afterwards taking them to Wigmore Abbey, now used as a farmhouse, but comprising some highly interesting buildings. The gate-house herewith delineated (see BUILDING NEWS for September 2nd, 1881), is an extremely picturesque piece of design eminently curious and quaint in its proportions. Beyond it is the abbey barn and pigeon-house, and in a line with it to the left are the guest-house and foundations of the abbey church. The gate-house itself is a long building of two low stories, the lower half of stone, with a stone arch through the middle reaching to the upper story, which is of timber, and projects on heavy oak brackets resting on a beam supported on stone corbels. It is now used as stables. The guest-house is of stone, and has its original roof, and retains a tall, 14th-century window on the west and a large Perpendicular one in the east end. The Tudor farmhouse was burnt down a few years ago. The half-timber farmhouse at Dodmore, of which Mr. Baker gives a sketch, is typical of good Shropshire work of this class, and the building contains one room still worth seeing for its fireplace of carved oak. The house is situated near Rock Green, and could be visited when driving from Ludlow through Stoke St. Milborough to Brown Clee and Titterstone. Culmington Church, with its stump of a spire; Elsiech Manor-house; Caynham Church, where there is a curious triple arch; Whitton Court, Stokesay Castle, Tenbury, Burford, Steventon, Orleton, Ashford Carbonell, Holgate, and Whitcliff furnish other sketches and chapters of interest, and, with the section devoted to the geology of the neighbourhood, make up the volume. To the architectural student visiting Ludlow Mr. Baker's pages are indispensable; to the library of the art lover his book will be a welcome addition, and as a model guide generally, Mr. Woodley's publication is well worthy of the occasion, nicely printed, and admirably produced. We wish more drawings such as these herewith given had been included of such subjects, for instance, as Ludlow Church.

EDINBURGH UNIVERSITY UNION—INTERIOR  
OF DEBATING HALL.

We published an exterior view of the new buildings with plans in the BUILDING NEWS for June 22nd last, and we now give an interior of the great hall. Mr. Sydney Mitchell is the architect.

## BIRMINGHAM POST OFFICE.

THIS plate to-day completes our series of illustrations of this important post-office now building. Our other drawings were given in the BUILDING NEWS for June 8 and Aug. 31, 1888. Mr. Henry Tanner, A.R.I.B.A., is the architect.

CHURCH OF ST. JOHN THE EVANGELIST,  
PUTNEY.

THE original church was designed by the late Mr. Charles Lee, and the enlargement has been designed and carried out by Messrs. Lee Bros., and Pain, of 8, Adelphi-terrace, W.C. The works comprise the enlargement of the chancel with a new chancel screen, the building of a north chancel aisle, and the enlargement of the vestry of which the first and second portions have at present been carried out. An alabaster reredos is now in progress from the designs of the architects. The accommodation of the church has been very materially increased, and the acoustic properties of the building much improved by the alterations. The cost of the works already executed has been £2,372, and a further sum of £800 is now required to carry out the enlargement of the vestries and for the choir seats. The works have been carried out by



Messrs. Adamson and Sons, builders, of Putney, and the reredos is now being prepared by them. Messrs. Hart, Son, Peard and Co. have carried out the ironwork. The reredos is to have a picture of "The Last Supper," by Messrs. Simpson and Sons, of St. Martin's-lane.

#### HALL OR CHAPEL AND CREMATORIA, ST. JOHN'S, SURREY.

THIS group of buildings to be erected for the Cremation Society of England is from the design of Mr. E. F. C. Clarke, of Westminster. The section shows the crematories and the relative position of the proposed chapel, making the most complete arrangement of the kind yet erected in this country.

#### THE MASSEY-MAINWARING COLLECTION AT BETHNAL GREEN.

THERE is now on view at Bethnal Green Museum what is undoubtedly a very splendid collection, and is, we should say, the finest private accumulation of such objects (since the dispersion of the Hamilton Palace Collection) in the kingdom. They have been lent, and carefully prepared, and arranged by the owners, the Hon. W. F. B. Massey Mainwaring and Mrs. Massey Mainwaring; and even now we understand not above half this gentleman's collection is on view.

We select a few objects of interest, but where there is such an *embarras de richesses*, the difficulty is to know where to begin and where to end. The Louis XV. Secrétaire is one of the most perfect and beautiful pieces of furniture we ever recollect to have seen; it is inlaid with coloured woods and mounted in ormolu, and in splendid preservation. The small round Table is also a good example of work in the same reign, which was noted for its beautiful furniture, before the designers adopted anything so rococo as they did later on. There is shown a Vase of Mennecey porcelain, holding porcelain flowers on ormolu stems, of Louis XV. period. The Hall Lamp next is very good in design. If nowadays manufacturers would only go straight to the fountain-head and copy some good old examples in every domestic and artistic article, what a difference it would make! The two Chalcies are worth notice as genuine examples. We have drawn them large in order that they may be well examined. They are both of the 17th-century period; the cup is silver-gilt oval, repoussé, with floral rococo ornament on spiral fluting. The Salt-Cellars are English 18th-century work, and these again would form good examples to reproduce from. The whole collection of porcelain, furniture, and silversmith's work comprises in each section some of the choicest examples extant, and will be a liberal education to anyone with the inclination and intelligence to examine them.

#### SKETCHES OF DECORATIVE FURNITURE.

WE illustrate to-day a sheet of decorative furniture, sketched at M. Edmond Kahn's, at St. Andrew's-street, Holborn. The Louis XV. Commode is genuine, of dark mahogany and tulip wood, and mounted with ormolu, chased and engraved handles, and escutcheons, surmounted by a slab of Breccia marble. The little Guerdon is modern, copied from an old example with ormolu mounts. The Sheraton Bookcase is also a copy of an old one. The Chair is Italian with stamped leather back of good design. The little Clock is Dutch, with the Bell on the top, after the style of the old clocks. M. Kahn makes a specialité of good modern French furniture, and has, as well as good examples of this, some very fine antiques that would be well worth looking into.

At the Hackney town hall on Monday evening a meeting was held for the purpose of promoting a scheme for providing North London with technical and recreative institutes. It is proposed to appeal for £200,000, the Charity Commissioners promising a similar amount, provided that this sum is raised, to erect an institute in each of the divisions of Finsbury, Hackney, Islington, and St. Pancras. Resolutions were adopted approving of the scheme and appointing local committees to put it into operation.

#### WAYSIDE NOTES.

I SEE that the competition season is commencing with its usual discouraging advertisements. There is one hailing from Cardiff, in which no hope whatever is held out that the successful competitor will be retained to carry out the job. Messrs. Cory Brothers, Limited, of Cardiff and elsewhere, invite plans and designs for new offices at Bute Docks, premiums £50 and £25, and Mr. John Cory's decision to be final. The Copenhagen competition is a slight improvement on that at Cardiff, and well worth anyone's attention, if, as I understand, it be an international affair. A premium of £800, which is the amount the successful competitor will receive, is a very liberal allowance, considering, too, that nearly the same amount will be divided between the second and third competitors. Whilst on the subject of competitions, I would express a hope that your fear that things have not gone altogether squarely in connection with the Friars' School at Bangor may be groundless. Anyhow, it will be as well if we can have definite information, as it is anything but pleasant to read that the governors have over-ruled the decision of their assessor, and adopted a design not included in the list of those favourably mentioned by the assessor.

The "Architecture of London" formed the subject of an article occupying something over two columns of the *Daily News* of the 14th inst. After a dissertation on the architectonic principles embodied in the new buildings in Oxford-street, and an assertion that Messrs. Kennedy and Francis's Art Depot, Messrs. Heath's new premises, and Duveen's shop foreshadow the rise of a new style, the writer criticised the new work in Mount-street, Grosvenor-square, and subsequently dilated on the architectural magnificence of the Victoria Embankment. Whitehall Court "is believed by some professional authorities to be the style of the London of the future." Rather a bold assertion for anyone to make! Mr. Norman Shaw's Police Offices come in for some deserved praise, and a tale is told of the blocks of granite forming the plinth being worked by convict labour. A eulogy on the houses over against the Temple Station and on the City of London schools, a rather hard slap at the School Board offices, and a wholly unwarranted rhapsody over the West-end branch of the Bank of England, bring the article to a conclusion, leaving the lay reader with a rather hazy impression that the architectural style of the future will be a cross between Duveen's Art Depot and Whitehall Court.

"The chief advocates of the return to a more formal kind of gardening," said the *Standard* of Monday last in the course of an article on "The New Style of Gardens," "are architects, and it is easy to understand why it is that they are so strongly in favour of it. They naturally think that there is 'nothing like leather,' and when they have completed the house they wish to invade the garden. It is an intelligible ambition: they sigh for other worlds to conquer." One must confess that there does exist this tendency "to invade the garden," and a very commendable desire it is for an architect to wish to arrange a beautiful garden; but we are not at all sticklers at the Italian style of landscape gardening, and a few of us, perchance, consider that the garden bears a direct ratio to the house and its size and importance. At any rate, I feel sure that an architect's garden would have none of those false, deceptive additions that ruin the effect of many so-called beautiful specimens of gardening. Affectation, undue mannerism, and deception are as destructive of effect in gardening as in a building. The article in the *Standard* was ably written and was well worth perusal, being, in general, a protestation against stiff and formal gardening where nature is subordinate to art.

The Dartford Local Board require the services of a surveyor, salary £200; applications to be made before the 27th inst.

Those who have been endeavouring to bring pressure to bear upon the "restorers" of Barfreton Church, and have been unsuccessful, have now an opportunity to go at the same sort of work in another part of Kent, not this time, a piece of curious round-arched archi-

tecture as at Barfreton, but an old church which is said to contain some of the finest specimens of 14th-century handiwork to be seen—the parish church of Milton-next-Sittingbourne. I have never entered the building, but believe it is to be visible from the L.C. and D. Railway. According to all accounts, it is at present in a very dilapidated condition, and the vicar has set on foot a movement for its restoration. The woodwork in several portions of the edifice is said to be decayed, and the old-fashioned pews are rendered objectionable by pieces of the ceiling falling into them. *New-fashioned pews*, I take it, would be equally objectionable under such circumstances. As matters now stand, Mr. W. Leonard Grant, of Sittingbourne, has prepared a scheme for the partial restoration of the church, which has been adopted, at a probable cost of £1,000.

Last Monday I was past the gate of the Farnborough Mausoleum—not much past it, as when I reached the lodge I was abruptly informed that no one was admitted to the place before 1 p.m. I cannot yet therefore say I have inspected the building in detail, but have now seen it from many points of view—from the heather-covered hills above the Long Valley at Aldershot, and from the common around Farnborough, and have made a hasty sketch from the station platform of its pretty little cupola, which rises grandly above a pine-clad knoll, forming a charming piece of sky-line that must be enchanting when seen against a glowing sunset sky. The cupola reminds me in its general outline, very much of that above the tower at the crossing of the church of St. Pierre at Coutances. GOTH.

#### CHIPS.

At the Midland Institute, on Nov. 13, the prizes were distributed to the second grade students of the Birmingham Municipal School of Art by Alderman Kenrick, M.P. The work of the year was shown to have made a remarkable advance, but Mr. Kenrick passed severe strictures upon the method in which, without adequate warning, the Education Department had disqualified the Birmingham students in the drawings for the life section of the national competition. Mr. E. R. Taylor, the head master, addressed the assembly on the development of design in schools of art.

Churchmen are particularly active in the new borough of Loughborough, and we learn that a site has been purchased on the Paget estate for the erection of a new church as soon as the necessary funds can be raised. In the meantime, an iron mission room is intended to be built.

The drainage of the village of Edenbridge is almost completed. Mr. Hill is the contractor, and the work has been carried out from plans by Mr. Jennings, engineer to the Sevenoaks rural sanitary authority.

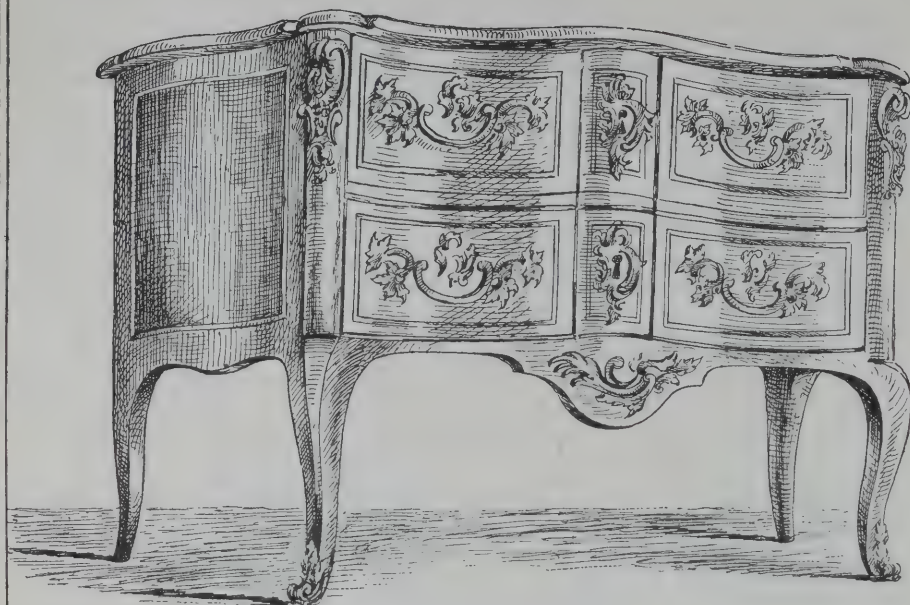
The Montrose Memorial Committee visited the studio of Mr. Rhind, Cambridge-street, Edinburgh, on Friday, and inspected and approved of the recumbent figure of the Duke of Montrose, which will be a prominent feature in the memorial at present in course of erection in St. Giles's Cathedral in that city, to his memory. The figure (life size) has been executed in marble.

The new business premises of the Devon and Cornwall Banking Company at Sidmouth have just been completed. Extensive alterations have been made from the designs of the bank's architect, Mr. E. Lyne Parsons, of Exeter. The work has been done by Mr. M. W. Critchley, of Sidmouth.

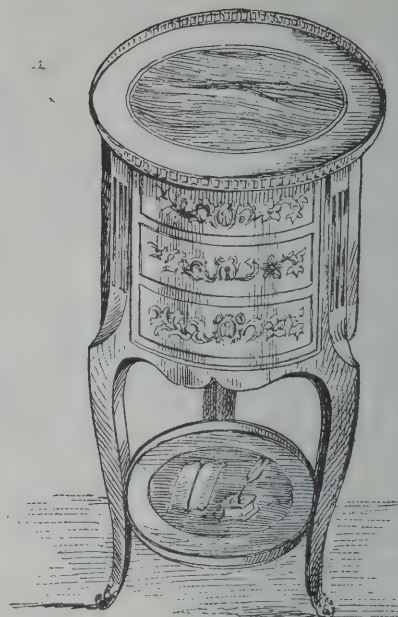
The Bishop of Manchester consecrated the church of St. Augustine, Newton Heath, on the 12th inst. It is built in the Early English style, and at present accommodation is provided for 540 persons. The internal fittings, roof timbers, &c., are of pitchpine, and the windows are glazed with lead lights. Externally the building is faced with red pressed bricks, the moulding and tracery being of Ruabon terracotta. The total cost, including boundary fences, fittings, and furniture, is about £4,000. Mr. A. W. Smith, of St. Ann-street, Manchester, prepared the plans, and the works have been carried out by Mr. G. Macfarlane, also of Manchester.

A special committee of the Manchester Association of Engineers have prepared a course of study for youths engaged in engineering workshops, with a view to enable them to become efficient workmen. A course of reading in evening classes is indicated, and for the purpose of systematic study. The syllabus has been arranged on the basis of that of the Science and Art Department.

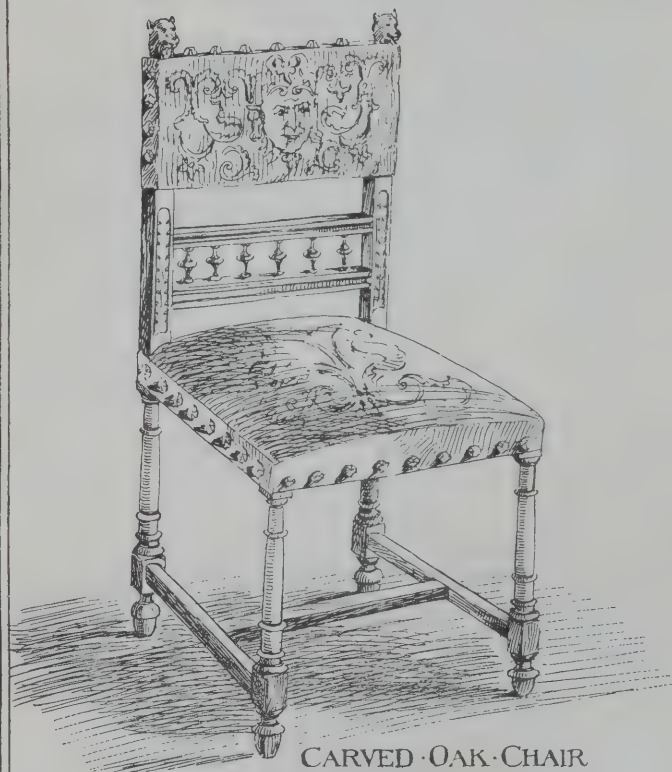




LOUIS XV COMMODE



INLAID GUERIDON



CARVED OAK CHAIR



SHERATON CHINA CABINET

CARVED  
WOOD  
CLOCK

SKETCHES OF DECORATIVE FURNITURE

AT M. EDMOND KAHN'S







SKETCHES IN ' LUDLOW TOWN AND N



DODMORE.



POR



THE OLD BELL LUDFORD.



WICMORE A



NEIGHBOURHOOD ' by Oliver Baker.



LUDFORD PRIORY.



BROMFIELD PRIORY GATEWAY.



THE GATE.



"THE FEATHERS" LUDLOW.



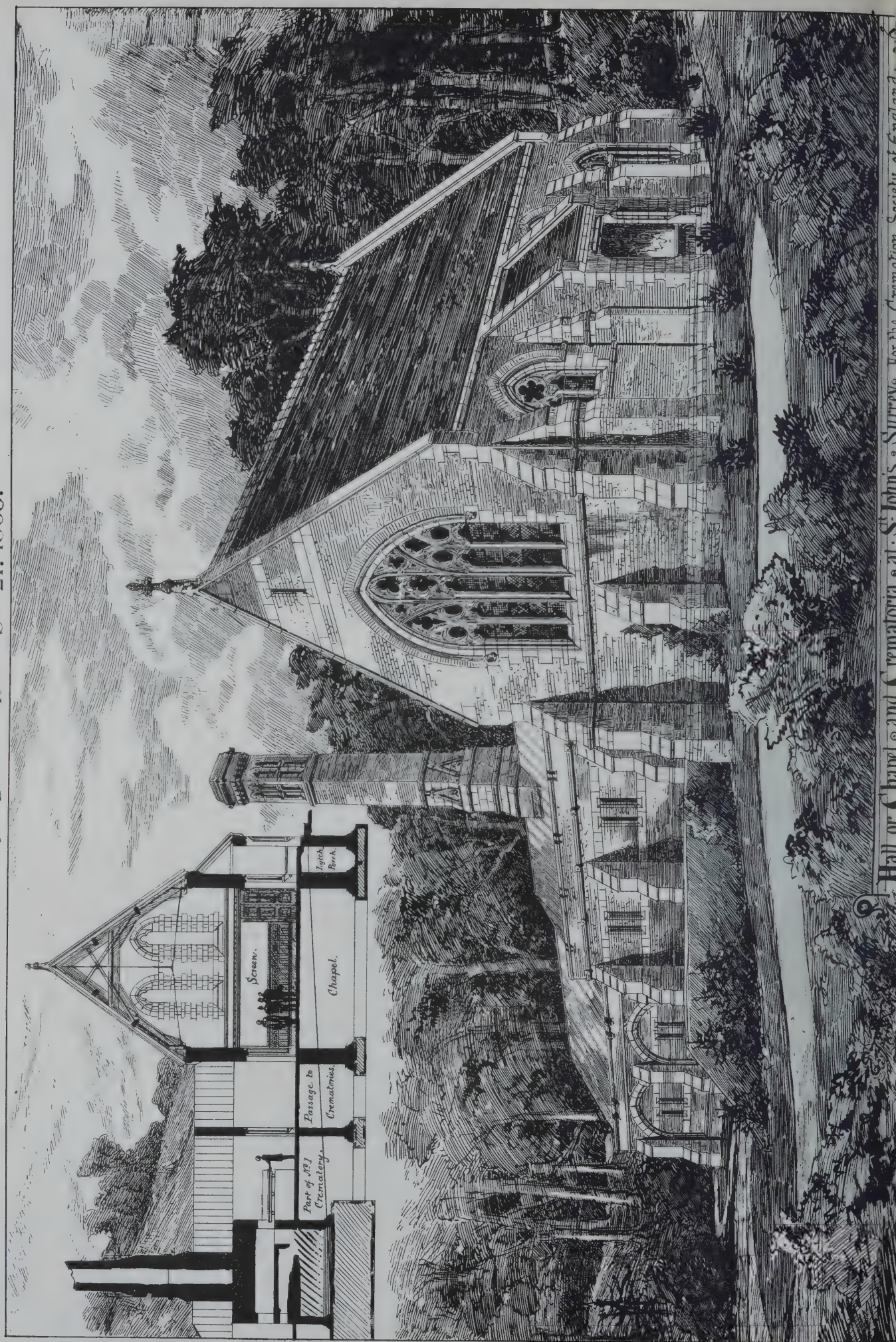








THE BUILDING NEWS, SEP. 21. 1888.



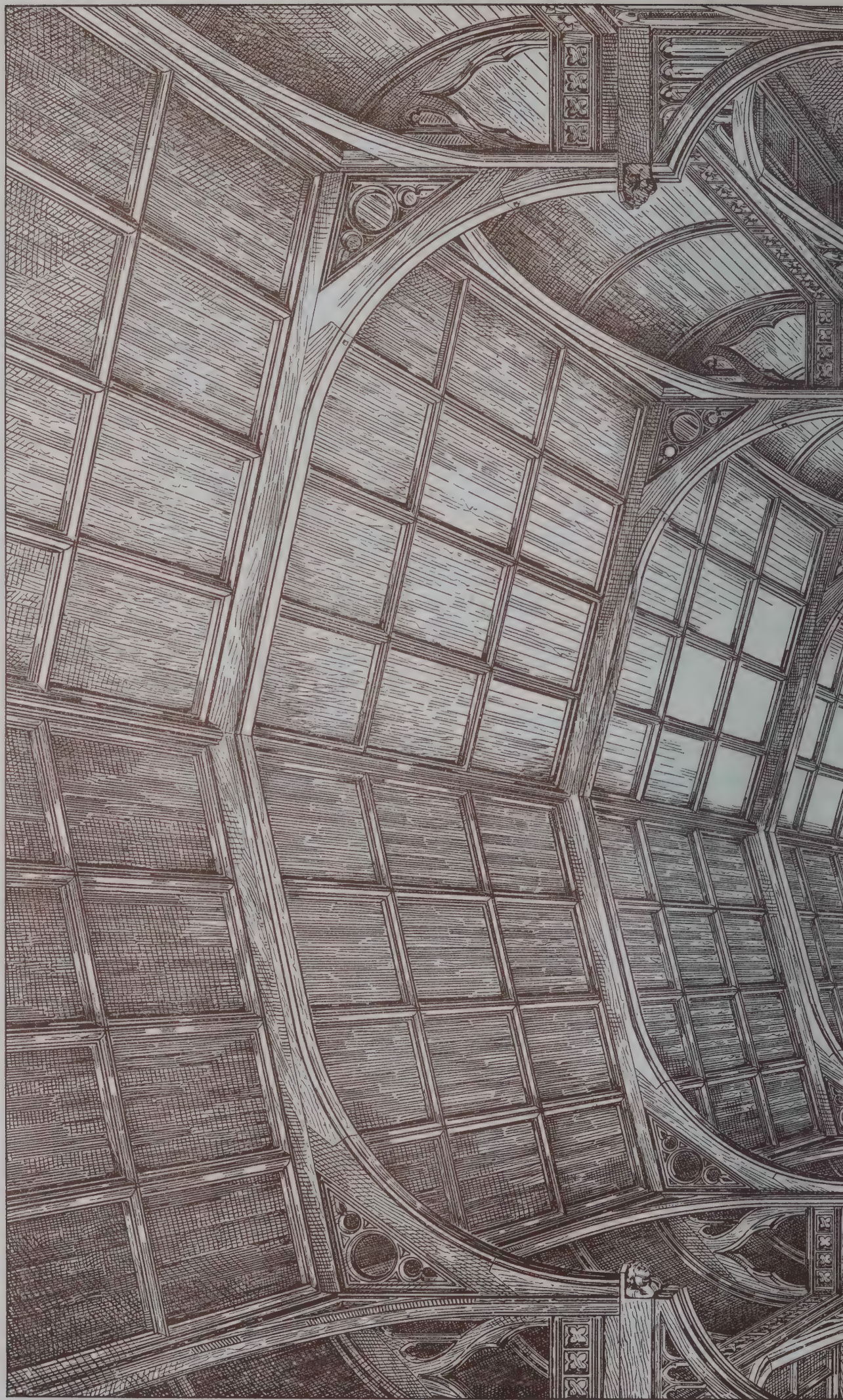
Hall or Chapel and Crematorium at St. John's, Surrey, for the Cremation Society of England.







THE BUILDING NEWS, SEP. 21. 1888.





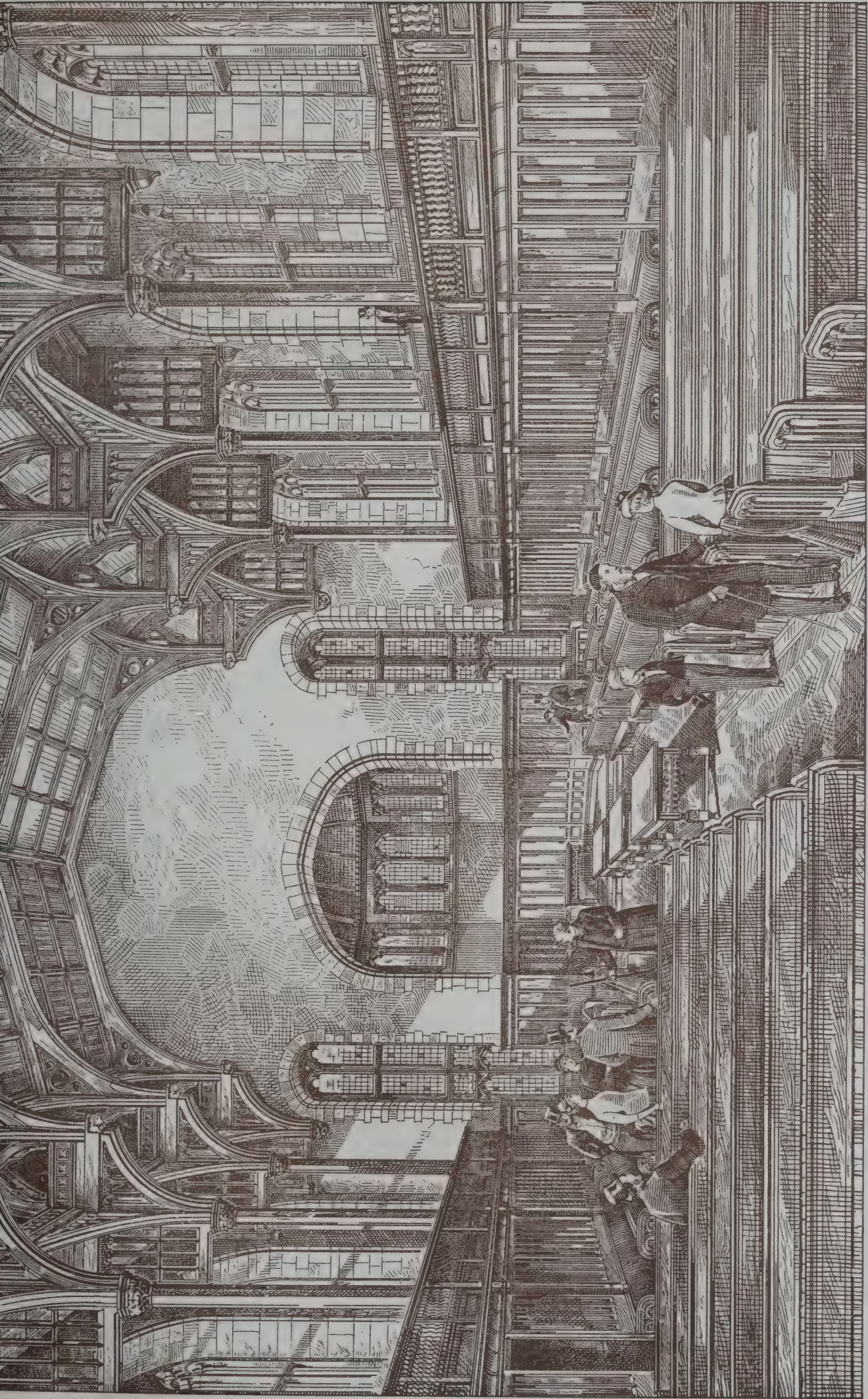


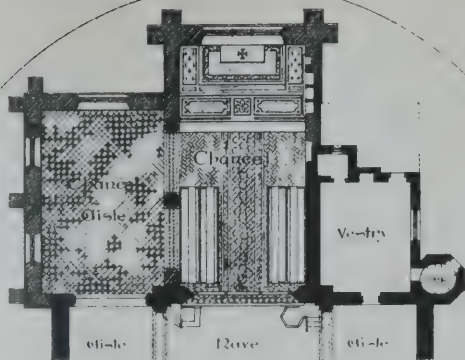
Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

INTERIOR · OF · DEBATING · HALL · EDINBURGH · UNIVERSITY · UNION · SYDNEY · MITCHELL · ARCHITECT









- Plan -



St John's  
Church,  
Putney.

New  
Chancel  
and

Chancel  
Aisle





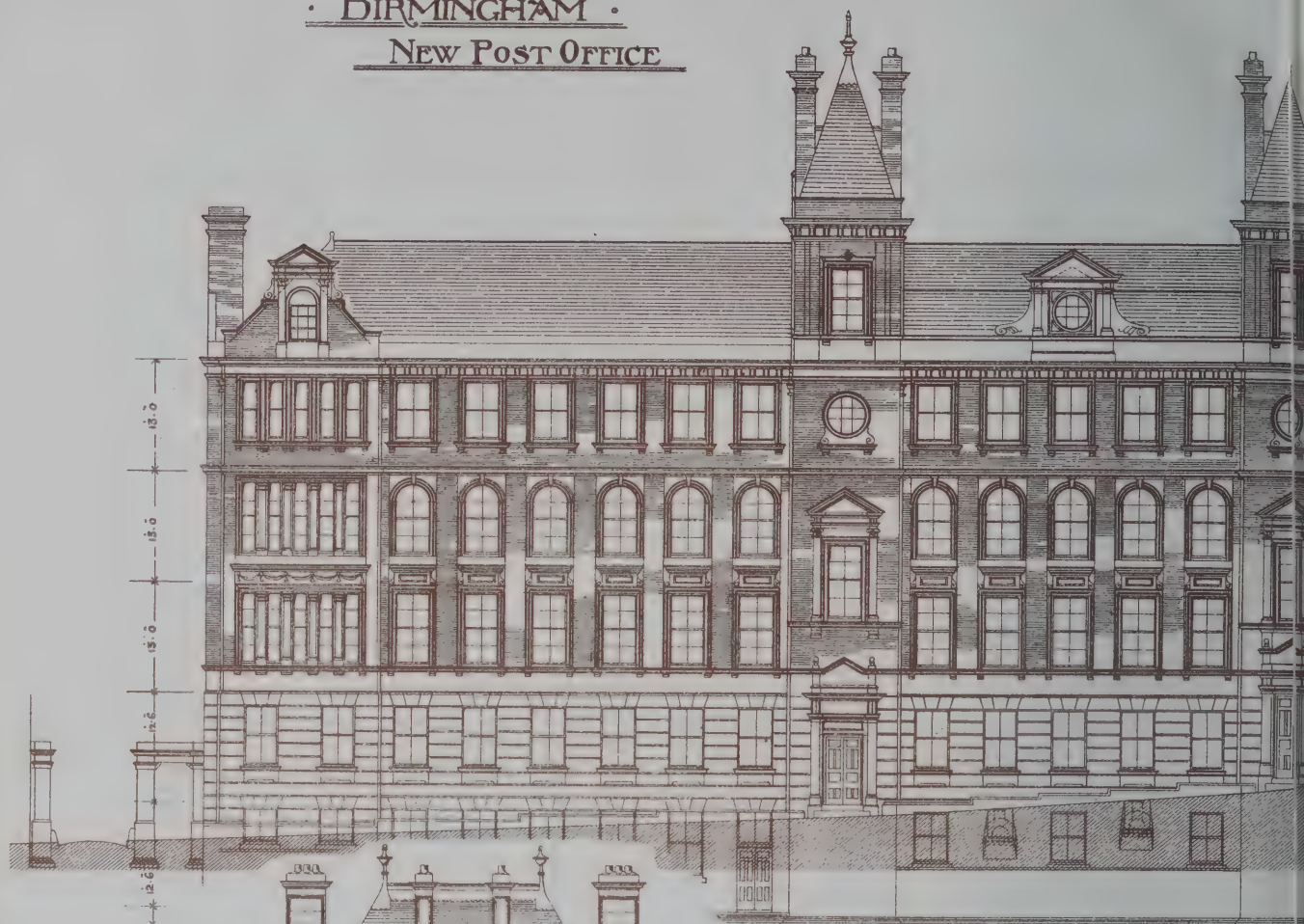








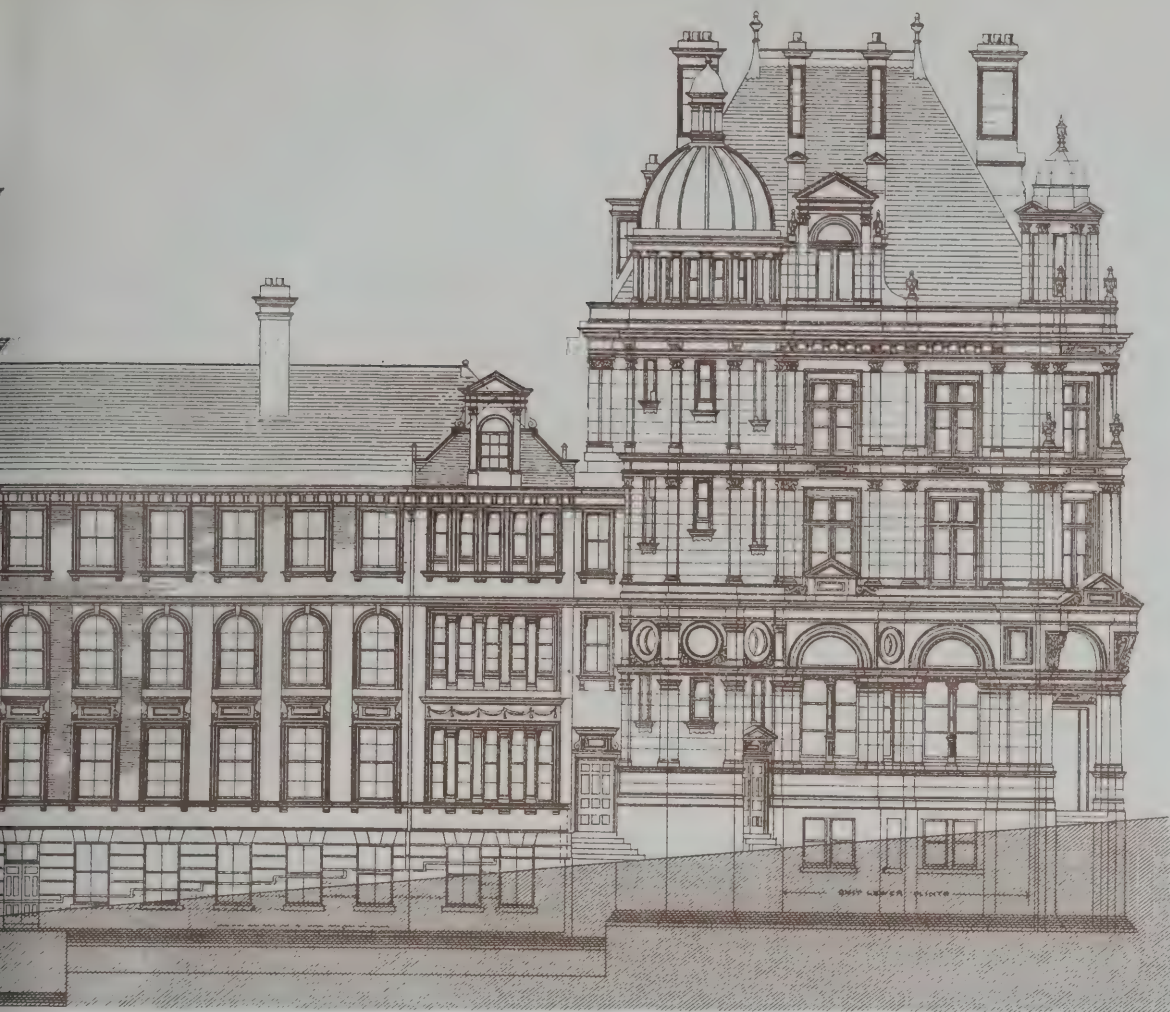
BIRMINGHAM.  
NEW POST OFFICE



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SCALE OF FEET



S. SEP. 21. 1888.



ELEVATION TO PINFOLD STREET

HENRY TANNER, A. R. I. B. A.

ARCHITECT.

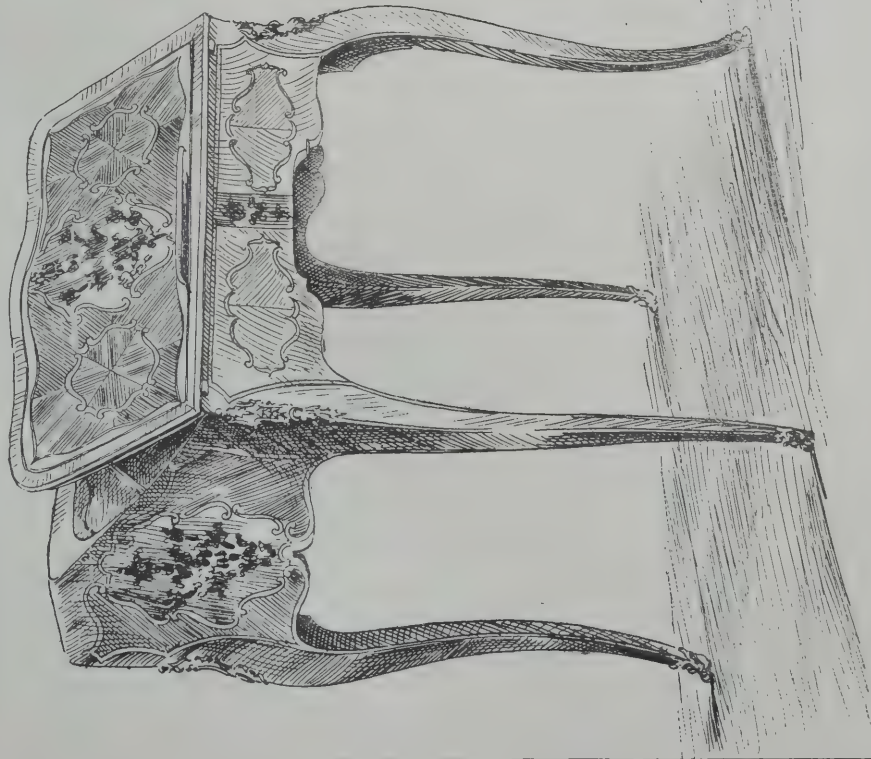
H. M. OFFICE OF WORKS.



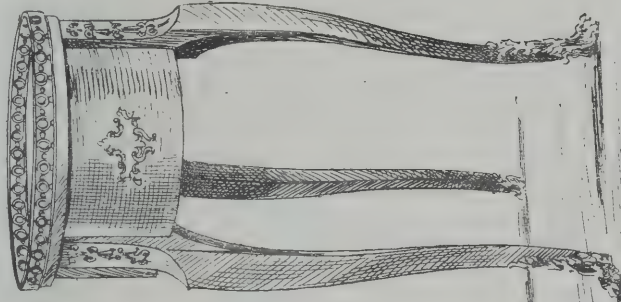




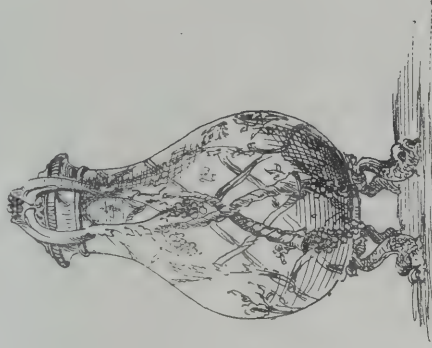




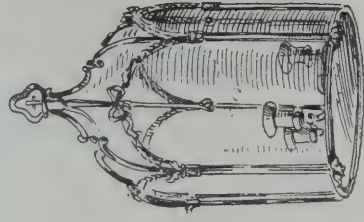
LOUIS · QUINZE · SECRETAIRE



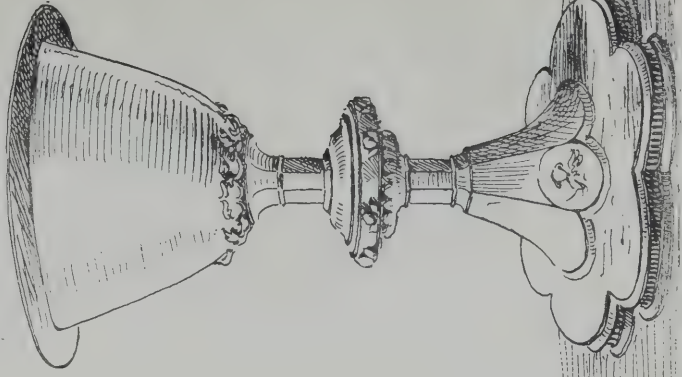
SMALL ROUND · TABLE  
LOUIS · QUINZE



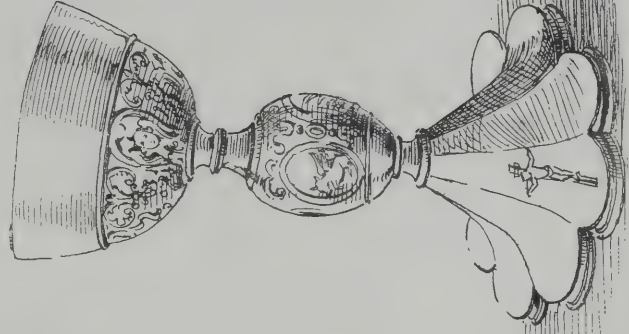
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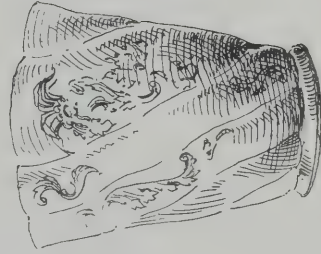
HALL · LAMP  
LOUIS · SEIZE



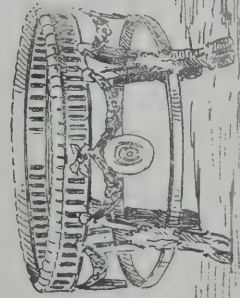
CHALICE & PATEN



XVIII<sup>TH</sup> CENTURY · CHALICE



SILVER · GILT · CUP



XVIII<sup>TH</sup> CENTURY · SILVER · SALT · CELLARS









# Building Intelligence.

**ARMAGH.**—St. Patrick's Cathedral, Armagh, reopened on the 16th inst. after restoration at a cost of £3,000. The building was founded, it is said, in 458, was twice burned, restored in the 12th and 13th centuries, and again injured by the fires of 1428 and 1641. The fifteenth century restorations destroyed almost all that remained of the Mediaeval structure, the fall of Primate Stewart's new tower crashing the walls, and in 1834 Cottingham was employed by Archbishop Beresford to rebuild the choir, to add pinnacles and buttresses to the nave and transepts, and to make good defective masonry in plaster. The congregation, under his arrangement of the interior, was crowded into the choir, the nave being used merely as a vestibule. Mr. R. Herbert Carpenter was consulted in 1886, and under the advice of Messrs. Carpenter and Howell, the first section of a restoration has now been completed, fittings and decorations being added to be added hereafter. The work now completed has included only what is absolutely necessary to utilise the whole of the cathedral, instead of, as formerly, only the choir and south transept with one bay of the nave. To effect this object the stone-faced choir-screen, erected by Cottingham, has been removed, and the whole length of the church is thus thrown open: the screen itself being re-erected in the south transept, so as to form a choir vestry behind. The once empty area of the nave is now seated for congregations partly with the old oak benches altered and adapted for the purpose, and partly with chairs. Although the choir is very small and narrow in its proportions, it has been re-seated on a dignified plan. The primate's throne is in its proper position, at the eastern end of the south side stalls. These are five in number, with a corresponding number opposite to them. In these two blocks of stalls the Chapter are arranged. Westward of these are the seats for the choirmen, with subillæ for the boys of the choir, and westwards, again, are two stalls on either side under the choir arch for the vicars choral. The whole of the choir floor, including that of tower, has been laid with a pavement of Minton's tiles, so arranged as to increase in richness towards the east. The stall work is not yet completed, nor is the canopy of the Primate's throne yet out of the carver's hands; but the framework of the new stall fronts and some of their panels are completed, and are erected, together with some of Cottingham's stall-work. The stone holy table erected by Cottingham being both too low and small, has been covered with oak, and with a richly-traced open-work front, through which the tracery work in stone is visible. The Cottingham choir-roof has been strengthened by the addition of trusses and bolts. The roof of the south transept has been rebuilt in simple pointed arch form, with moulded panels and ribs. The heating has been partially rearranged, and includes both new pipes in benches under grating in the choir as well as coils in the aisles, and new boilers. Messrs. Musgrave have carried out these works. The contractors for the general works are Messrs. Colten Brothers, of Portadown; while Messrs. W. Bowdler and Co., of Shrewsbury, have carried out the new throne, stallwork, and vestibule. The metal work is executed by Messrs. Singer and Sons, of Frome, and Mr. Gawthorpe, of London. After the resignation of the former clerk of works Mr. Smith was appointed, and has superintended the completion of the contracts.

**BRISTOL.**—The schools which have been erected by the Bristol School Board in Easton-road were opened on Friday. They are Gothic in style, pleasantly located, and have been erected at a cost of £4,500, exclusive of interior fittings. They are built of grey Pennant stone, with freestone dressings. The interior fittings and dadoes are of pitch pine. The steps and landings are also of Pennant stone. The building consists of a centre block and two wings. In the former are eight class-rooms, four on each floor, each 29ft. by 25ft. 6in., and accommodating a total of 500 children, in four divisions. The four class-rooms on each floor are divided by glazed sliding screens, which, when thrown back, convert the space into one room, 58ft. by 51ft., for combined teaching or

drilling. The rooms are lighted by windows at front and back, and fitted up with dual desks, and separate seats for each child, with galleries for infants. The staircases are 11ft. wide, with steps 5ft. long, each step being 12in. wide, with a 6in. riser. Teachers' rooms, 12ft. by 11ft., are provided in each wing. There are two playgrounds in the rear, each 60ft. by 48ft., laid with asphalt paving, one-third of which is covered with play sheds. This portion of the work has been carried out by Messrs. Sampson, engineers, of Bedminster; the ventilation is by Messrs. Robert Boyle and Son (Limited), of London; Messrs. Hansom and Bond were the architects; Mr. T. R. Lewis, of Clifton Vale, was the contractor; and Mr. Geo. Downes the clerk of works.

**COVENTRY.**—The ground has been broken for laying the foundations of a new theatre in Hales-street, Coventry, for Mr. William Bennett. The plans have been prepared by Messrs. Essex and Nicoll, Birmingham, and Mr. C. Gray Hill, builder, of Coventry, has secured the contract for the erection of the building, the cost of which is estimated at about £4,000. The area of the main body of the building will be 108ft. by 66ft., in addition to which there will be refreshment-rooms. The stage will be 73ft. wide by 27ft. deep, with a good proscenium 24ft. wide. To the ground floor there will be three entrances from Hales-street, with a side entrance and a stage door; and there will be four staircases to the upper parts of the house and galleries. The size of the pit will be 48ft. 3in. by 53ft. 9in.

**DUBLIN.**—Dr. Walsh, the Roman Catholic Archbishop of Dublin, laid, on Sunday last, the foundation-stone of a new structure intended to increase the accommodation of St. Mary Magdalen's Asylum, Lower Gloucester-street. The new building will be a continuation of the present asylum. It will face Lower Gloucester-street with a frontage of 75ft. by 30ft. wide. The structure will be three stories high, and will be built of County Dublin bricks, with dressings of red bricks to the windows and doors, and with limestone groins and strings. Mr. William H. Byrne, of 20, Suffolk-street, Dublin, is the architect, and Messrs. Meade and Sons, Great Brunswick-street, in the same city, are the contractors.

**LEEDS.**—A new Wesleyan chapel in Dewsbury-road was opened on the 12th inst. The chapel has been built of pressed bricks, with stone dressings, in the Italian style of architecture, from designs and under the superintendence of Mr. Geo. F. Danby, of Leeds, whose plans were selected in a limited competition. It is arranged to accommodate 800 adults, and is 75ft. long, 48ft. wide, and 33ft. from floor to ceiling. All the external doors open outwards. The woodwork internally, including the pulpit, is of pitch pine varnished. The ceiling is panelled and enriched in plaster, and finished with a cove next the walls. The total cost, including the land, is about £4,200.

**TOOTING.**—The new Roman Catholic College at Tooting was opened on Monday for the reception of students. The building has been erected on the Hill House Estate, immediately adjoining Tooting Bec-common. The buildings are in red brick, with Portland stone dressings, the style being the French Renaissance. The buildings have a frontage of 196ft., the central block being 130ft. in length and 52ft. in width, while the wings are 123ft. long and 33ft. wide. The chapel, on the first floor, is 80ft. long, 30ft. wide, and 35ft. high. The altar is in Caen stone, the altar table being of white veined marble, supported by four pillars of Irish marble. Mr. W. Harvey, of Whitehall-place, is the architect, and Messrs. Higgs and Hill the contractors. The mansion, which was included in the purchase, will be used as the sanatorium of the College.

**WALLINGFORD.**—A substantial and commodious church house and Sunday-school, in connection with St. Leonard's parish, has been recently opened in Wallingford by Lady Wantage. The architect was Mr. S. C. Johns, M.S.A., of Crowmarsh, and the contractors, Messrs. Brather Bros., a local firm.—On Wednesday, the cap stone of the gable of a school house at Mongewell, a pretty and sequestered spot about two miles from Wallingford, was laid by Master Bernard Fraser, youngest son of Mr. A. C. Fraser, of Mongewell House. The

building was erected in memory of her mother by Mrs. Fraser, and is in the Dutch style. Mr. S. C. Johns, M.S.A., of Crowmarsh, was the architect, and Mr. Higgs, of Goring, the contractor.

## COMPETITIONS.

**BANGOR.**—The Friars' School competition has not yet been settled, and the referee, Mr. Herbert Carpenter, informs us that no design has yet been before him.

**BIRKDALE COMMON NEW CHURCH.**—The building committee decided to obtain designs for this church, and invited several architects to send in designs. The plans were submitted to Mr. Ewan Christian, the architect to the Ecclesiastical Commissioners, as assessor. His award has been in favour of the plans designed by Mr. J. Francis Doyle, of Liverpool. The committee accepted the award, and have instructed the architect to proceed with the work forthwith. The church will accommodate 600 worshippers.

**CORSTORPHINE, N.B.**—The Free Church at Corstorphine is to be enlarged from the plans of Mr. J. Macintyre Henry, architect, Edinburgh, whose design was chosen in a limited competition held recently. He has received instructions now to procure tenders for the work, which will so enlarge the church as to secure 140 additional seats. The organ and choir will be located in an apsidal-ended building behind the pulpit, and this wing will have a groined roof and be separated after the manner of a chancel by an arch of stone from the body of the church. The ventilation of the buildings is to form an important part of the scheme.

**HEREFORD.**—It being decided to erect as the Herefordshire Jubilee memorial a much-needed hospital for diseases of the eye and ear, plans were advertised for, and referred to the council of the R.I.B.A., who appointed Mr. Henry Currey to decide upon their merits. His award was in favour of the design marked "Spes," and its author, Mr. E. H. Lingen Barker, has been commissioned to carry out the work.

## CHIPS.

A bust of the poet Gray, modelled by John Bacon, R.A., and formerly in the collection of Stoke Pogis Manor House, has been presented by Mr. Joshua Butterworth, F.S.A., to Pembroke College, Cambridge.

Last year the inhabitants of Hovingham, near Malton, Yorks, determined to erect a new bridge, connecting the churchyard with the new cemetery, as a commemoration of the Jubilee of Her Majesty's reign, and Sir William Worsley has just laid the foundation-stone of the new structure, which is to be of stone. Mr. Randolph, of Hovingham, is the architect of the bridge, and Mr. Oldfield the contractor.

Mr. E. J. Physick, sculptor, has just erected a sculptured memorial in Sicilian marble at Long Melford, Suffolk, in memory of Hyde Parker, of the 8th King's Regiment, eldest son of Sir William Parker, Bart., of Melford Hall.

The memorial stone of new buildings for the Dennistoun Evangelical Union Church, Glasgow, was laid by Principal Morison, the founder of the denomination, on Saturday afternoon. Designed by Mr. Malcolm Scott, jun., I.A., Glasgow, the buildings, which are in the 16th-century Scottish style, are being erected in Ballochmyle red stone; they are being erected at the corner of Finlay-drive and Meadowpark-street, at a cost of about £2,600. The church will accommodate about 550 sitters, and will be provided with the usual halls and classrooms.

The new public buildings at Street, Somerset, erected in memory of the Queen's Jubilee, have been completed by Mr. Huish, the contractor. They comprise a vestry room, caretaker's room, fire brigade station, retiring room, and rooms for the parish hearse and for parish business. The buildings abut on the Crispin Hall, and are built of similar stone.

Important alterations have just been effected to the buildings on Manchester Racecourse, from plans by Messrs. Magnall and Littlewood, of that city. They include new club buildings, with balcony seated for 360 persons, new horse and saddling boxes, and enlargement of the jockeys' room. Messrs. R. Neill and Sons, of Manchester, have carried out the works at a cost of £10,000. The formal inspection by the members took place on Saturday.



## Engineering Notes.

**DUNDEE.**—Messrs. Kinnear, Moodie, and Co., Glasgow, have secured the contract for the erection of a new station for the Caledonian Railway Company at West Dock-street, the present premises being too small for increasing traffic. The new building, designed in the Scottish Baronial style, will have a frontage of fifty yards to West Dock-street, and will be provided with waiting-rooms, refreshment-rooms, booking-office, parcel-office, telegraph-office, &c., on the ground floor, the flat above being reserved for the goods manager's department and a dwelling-house for the station-master. Docks are to be provided for the arrival and departure of the trains on the main and branch lines, the main platform extending a distance of 800ft. and the branch line platform 600ft. The cost will be between £30,000 and £40,000. Messrs. Kinnear, Moodie, and Co., erected the goods station for the Company at Dundee; they also enlarged the Perth station, and are at present engaged in the construction of the railway hotel at Perth.

**HULL.**—On Thursday, the 13th inst., a new bridge across the River Hull was opened at Hull. The structure leads from Clarence-street, Drypool, to Salthouse-lane, and forms a direct means of communication between the centre of the town and the main thoroughfare to the Docks. The length of the bridge is 197ft. It is built of iron, and the whole of it is movable except a small portion at the east end. The principal span is 80ft. It is built on cylinders sunk in the bed of the river, and is worked by hydraulic power. The cost, together with the approaches and the property required, has been about £30,600. The iron-work of the bridge has been done by Messrs. Butler, of Staningley, and the quays and stonework by Mr. T. Mather, of Hull, who were the contractors. The bridge was designed by Mr. J. Fox Sharp, C.E., late borough engineer, but owing to the resignation of that gentleman, the carrying out of the work was done under the supervision of Mr. A. E. White, the present borough engineer.

### ARCHÆOLOGICAL.

**DR. SCHLIEMANN'S EXCAVATIONS AT MYCENÆ.**—The excavations commenced by Dr. Schliemann at Mycenæ are still being energetically carried on, and continue every day to bring to light fresh objects of great archæological and anthropological interest. The entire terrain around the town is full of tombs belonging to an epoch antecedent to Homer. These pre-Homeric sepulchres are cut in the solid rock and carefully formed in regular compartments, with an area of from thirty-five to forty square metres. In these chambers the dead were laid without being covered with earth, nor were they cremated, as at the time of Homer. Among the numerous objects discovered at Mycenæ in the course of the latest diggings are articles of glass, crystal, and ivory, besides precious stones with engravings of animals charmingly executed, the whole treatment being Oriental in character.

The alterations now being effected at the church of St. Andrew, Canterbury, now disused for purposes of public worship, and intended to be converted into a parish-room and Sunday school, are nearly completed. The work has been carried out by Mr. J. E. Wiltshire, builder, of that city, in accordance with plans prepared by Messrs. Cowell and Bromley, of Canterbury and Folkestone. The new vestibule and classroom is treated in very fine Renaissance, Portland stone and Bracknell bricks being the materials of which it is constructed. There is a carved frieze over the entrance, and above, in a niche, is a statuette of St. Andrew carrying his cross.

A new pulpit, constructed by Mr. B. Paylor, of Leeds, was used for the first time in Pudsey parish church on Sunday. It is Early English in style, and is of Caen stone with shafts of red Dumfries and green serpentine. The church itself was restored last year at a cost of over £1,000.

The Fearon Memorial Hall and Schools at Loughborough are now rapidly approaching completion. Mr. George Hodson, C.E., is the architect, and Mr. William Needham the contractor.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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J. VEALE. (They are not really wrought iron, but twisted white hot. We certainly prefer English work, such as that of Stodge and Co.)—A. ATKINS. (We do not think you will readily beat those of the St. Pancras Company, either for price, quality, or firmness.)—J. PRINCE. (Yes—a good deal of "gas"—about the description, as well as the apparatus.)—R. M. (Try Clark's siphon stove; no fine is required, and we hear it well spoken of.)—L. PARDON. (Better go to a good maker like Sax; we know nothing of the provincial firm you mention, while his prices are certainly as low, and you may depend on good work; and badly-fixed electric bells are the very mischief. Read up the series on "Electric Bell-Fitting and Construction," now appearing in the *English Mechanic*.)—W. W. (Engert and Rolfe's "long lengths" will do—they are 32in. wide.)—M. L. L. (Copper, certainly—Holden and Co., or Ewart and Co.)—J. B. B. (Won't the Bostwick folding steel gates do? See advertisement pages.)—F. D. (We don't think you'll beat West and Collier, of Hambledon, for cheapness, and they are really wonderfully strong at the price, and comfortable to sit on. Don't try the iron abominations—they may do for an Italian restaurant, but are dreadfully out of place in a church.)—ENQUIRER. (Hawley's have stood the test of time, and they feel and look comfortable, and are so easily replaced in parts.)—TEAK. (Try at Shewin's, Back-hill, Hatton-garden. He makes a speciality of hard woods, and you may reasonably depend on the stuff being well seasoned.) 2. Yes, it will go like that, and nothing seems to stop it; it's a pity, as you say, for it looks well, and otherwise wears well.)—BEACON. (Impossible to answer such questions without a personal examination of adjoining rights. This is a matter for your architect, and if he is unable to decide, for a solicitor.)—ARCHITECT, Omaha. (On the whole, we think the Hoffmann Kiln is superior.)

## Correspondence.

### ARCHITECTS' MISDEEDS.

To the Editor of the BUILDING NEWS.

SIR,—Lord Grimthorpe is always a safe "draw" in an architectural paper (see "B.N." of Friday, p. 359), though others than architects can give him credit for good works—e.g., the *Church Times* of this week in its first leader; but I never see the misdeeds of architects shown up in professional papers. Your correspondent

with the A.A. excursion last month, for instance, praises young Scott's reredos in Bakewell Church, but he quite omits to censure the treatment of the ancient sedilia which he has left useless by his alteration of levels. The eastern one is too high, the western too low, and the middle one blocked by his new altar rail; he has, moreover, removed the foot plate.

Did any architectural paper condemn the elder Scott's treatment of the choir of Ripon or Street's of the pavement of Hedon Church or his burying the Norman font at Garton? Kirkburn to make way for an alabaster one of his own, or his roofing the "strong room" of Dublin Cathedral with lath and plaster? Could quote scores of such bungles committed by professional men great and small. Did the "B.N." ever mention them? I trow not. Wonder, then, if Lord G.'s opinion of the profession and its organs is spreading among people who care to think for themselves.

W. H. M. ELLIS, M.A. Cantab.  
University Club, Dublin, Sept. 17.

### THE LONDON SCHOOL BOARD REPORT.

SIR,—One of your contemporaries, in commenting on the references to the late architect's department, takes rather a one-sided view of the case.

It was, I think, a fact that when Mr. Robson was appointed he was to give the whole of his time to the duties of the office—a condition which prevented many eminent architects from offering themselves for the appointment. For a short time this condition was relaxed, and we find Mr. Robson engaged in competition, &c., and making a good private practice. If Mr. Robson found that he could not properly perform the heavy duties of his office and his private practice, surely it was his duty to lay the matter before the Board.

I may add that Mr. Robson is a stranger to me; but, as a ratepayer, I cannot help thinking that somebody should have seen that the work was carried out according to the drawings and specification.—I am, &c., RATEPAYER.

### ARCHITECTURAL PLAGIARISM.

SIR,—Perhaps I should apologise to Mr. Hall for having so moved him; but really I had no idea that the few words in mine of the 7th inst. would have had such a disturbing effect!

I confess my inability to enter into the maze of evolution which he indulges in. I do not see the connection with the point at issue. When I used the word "plagiarism," it was in its broadest sense, and I had not Mr. Hall's examples before me.

I may not have been quite explicit; but in taking up and using Mr. Hall's own words, meant to infer that if a man did not possess "ideas" and "individuality" of his own in architecture, he was safer to borrow (or steal) from some recognised master than trust to his own abortive attempts; for verily a thing of beauty (though stolen) may be a joy for ever, whereas an abortion, however much bearing the mark of individuality, can never be so, but an eyesore for ever.

I love originality, but I like it to be good. I cannot agree with the dogma that any style is better than none simply because a man is individualised by it. I cannot accept originality at any cost.

I still maintain that the best and most original men of the day are those who by patient study and heartfelt work have succeeded in collating and moulding into concrete form the abstract ideas of master minds that have gone before.

I would remind Mr. Hall that originality may be strained and become absurd; instance his fearful joke on my innocent name! What is the "soaring" flight of ideas here? What an awful descent he had to make, and what a drain upon his imagination, when he had to descend to that "Culvert"! I am afraid your readers will require a surgical operation performed upon them ere they can see to the depth of this joke!

I must apologise for again intruding upon your valuable space.—I am, &c., EDWARD CALVERT.

### WORKMEN'S DWELLINGS AT AINTREE.

SIR,—I see that you state last week that Mr. J. W. Mee, Manchester, was awarded the second prize; this is, unfortunately, incorrect



use the designs of Messrs. Sugden and Mr. were considered of equal merit, though being in excellence in various points, and each awarded 50 guineas, which was the amount of the first prize advertised, so really there was no second premium awarded, but the first prize was awarded in the usual way.—I am, &c.,  
WM. P. HARTLEY.  
Intree, Liverpool, Sept. 18.

## STRAINS.

RE,—In a letter which appeared in your issue "C. A. B." very clearly explained the matter under discussion, and has shown me where and how the difference has arisen, it being one of definition only. Under the term "near" I have included cross compressional strains caused by compounding what he calls R. and L. shears. To do so was possibly an error of judgment; but these strains are so easily considered, and are so readily taken and signed for concurrently with the shears, that I consider myself to have been justified in using one diagram.—I am, &c.,  
G. A. T. MIDDLETON.

## COMPULSORY EXAMINATIONS FOR SURVEYORS TO SANITARY AUTHORITIES.

SIR,—"Goth," in his Wayside Notes, calls attention to the above subject, and informs our readers of a note in the R.I.B.A. Journal to the effect that if surveyors to sanitary authorities were compelled to pass a qualifying examination, "jerry building" would cease to exist.

Having been an assistant in local board offices in different parts of the country, I have had many opportunities of peeping behind the scenes, and I am strongly led to think that the establishment of a compulsory examination would be the first nail, and a very tenacious one, in the coffin of jerry building.

Many of your readers would be astonished were they to see some of the plans that are submitted to local authorities for approval. I have seen plans that had been "passed" which showed rooms, but had no means of getting light or lighting them. Can this sort of thing be wondered at if they have to be submitted to surveyors who know so little of plan drawing as not to be able to detect the error?

If plans are passed so easily and such slipshod drawing accepted, there is no wonder "jerry-buildings" are also passed, and slipshod work outside accepted.

Many of these wonderful specimens of draughtsmanship are submitted without the name of the architect, or, more correctly, I hope, the person who makes the drawing. The model by-laws issued by the Local Government Board contain no clause to compel this, which I, I think, an important omission.

If surveyors were compelled to pass an examination, it would bring about some degree of uniformity in their requirements—a desideratum the benefit of which would be strikingly felt in the suburbs of London and other large towns where houses are built irrespective of the parish boundaries.

An instance occurs to me which illustrates the inconvenience of this difference of opinion. In a road in the northern suburbs of London the houses have been nearly all erected by one builder; but half are in one parish and half in another. One surveyor insists upon an "interceptor" being inserted in the drain; the other not only does not insist, but will not allow, an "interceptor" to be put in. Verbum sat.

Some surveyors will say that the powers given them by the by-laws are very limited in regard to the prevention of "jerry building." With this I agree; but if the ranks are purged of the incompetent ones, there would not be that necessity to curb their powers at present so desirable.—I am, &c.,  
AN ASSISTANT SURVEYOR.

## DISCREPANCIES IN SURVEYORS' VALUATIONS AT PONDER'S END.

SIR,—Referring to the report in your last issue, I may explain that the question under consideration was the damage done to two acres of land suitable for building by its being crossed (partly in a diagonal direction) by an effluent sewer.

Your readers can form their own ideas as to

the effect on the value of land, especially when it is considered that the drain discharges into a brook which fills rapidly, and frequently stops the outfall altogether.—I am, &c.,  
HENRY LOVEGROVE.

## LYDFORD CHURCH.

SIR,—As one amongst many who take a deep interest in Lydford Church, allow me to make a few remarks. I was astonished to read the letter of "Curious," and of the way in which the parson had played fast and loose with the plans of three previous architects. I believe Mr. W. S. Hooper is an architect; and, if so, I suppose the church is in safe hands, and that the first account I heard—namely, that a country mason or builder was about to be let loose in the church—is incorrect.

The church is of considerable interest, and is dedicated to St. Petrock. It consists of chancel and nave, with south aisle, south porch, and west tower. It is mainly Perpendicular in style. The font is Early Norman, and the roof Perpendicular, of the usual cradle type, with moulded ribs and bosses. The nave is separated from the aisle by an arcade of four bays. There are two piscines. The S.W. angle of the chancel is pierced by the rood-stairs, two of the steps of which are pierced to form a squint, a very quaint combination. Chairs have taken the place of the "deal tanks."—I am, &c.,  
STILL MORE CURIOUS.

## CHIPS.

Mr. David Patrick, of Ward, Dalry, died on Friday night in his seventy-third year. Mr. Patrick was very widely known throughout Ayrshire, having acted as district road surveyor for the long term of fifty years. In Mr. Patrick, says the *Scotsman*, the Road Trust have lost a shrewd and painstaking surveyor, who knew his business in every detail.

The tower of the parish church of Burnham, Somerset, has been restored, a work carried out by Messrs. Harding Brothers, of that town, and the bells have been rehung by Mr. Stokes, of Woodbury, Exeter.

The wills of the great railway engineers of North Wales, Benjamin Piercy and Henry Robertson, M.P., who were closely associated in all projects affecting the northern portion of the Principality, and who died within two days of each other in March last, have just been proved. The personal estate of Mr. Piercy has been declared at £324,574, and that of Mr. Robertson at £185,528.

The disused grammar school at Stroud, Gloucestershire, has been altered and refitted at a cost of over £700 to serve as a free library, and was reopened with a nucleus of 3,300 books on Saturday last.

The new Queen's Theatre at Longton, Staffs., was opened on Monday week. The principal or Commerce-street front of the theatre is of red stone, the design being Free Renaissance. The stage is 68ft. wide by 48ft. deep, the proscenium being 27ft. wide and 34ft. 6in. high. The architect of the theatre has been Mr. J. Taylor, of Longton, and the builder Mr. T. S. Bromage, also of Longton.

A new Baptist chapel in Oxford-road, Moseley, built from plans by Mr. J. P. Osborne, of Colmore-row, Birmingham, which were chosen in competition, was opened on Friday. The style is Decorated Gothic, the plan is cruciform, and the chapel is seated for 600 persons, with lecture-hall adjoining accommodating 250. A spire is built at the north-west angle, that next the road. The contractor was Mr. William Bloore, and the cost has been £7,500.

A marble memorial has been erected on the grave, in Woolston Cemetery, Southampton, of the late Professor de Chaumont, F.R.S., the well-known Professor of Military Hygiene at Netley. It consists of a massive headstone, resting on a base, enriched with carved crockets in low relief around the edges. The grave is inclosed with a marble kerbing, with broadly chamfered edges. The memorial is the work of Messrs. Garrett and Haycom, of East-street, Southampton.

The Edinburgh water trust received at their last meeting a report from their engineers, Messrs. Leslie and Reid, stating that additional sources of supply would have to be sought ere long, as the trust is scarcely able to meet the demands upon it. A description of five different schemes were given, the Manor Water and St. Mary's Loch being indicated as not likely to yield good results. On the motion of Sir James Gowan, Dean of Guild, the engineers were instructed to bring up a detailed report on the various sources of supply available.

## Intercommunication.

## QUESTIONS.

[9753].—**Water Tables.**—A subscriber would be glad to know of a book of tables or ready reckoner that will give the number of gallons of water per minute over a gauge 6in. in width by the depth.—T. R., Dilworth, Newcastle, Staffordshire.

[9754].—**Professional Charges.**—Will some kind reader oblige me by informing me what professional fees I am entitled to for the preparation of preliminary sketches, working drawings, and specification, and procuring offers for a range of artisans' dwellings which my client is not to erect? Are the charges laid down in Hurst's such as would stand the test of a Court of Justice? An answer in detail from some experienced member of the profession would relieve the difficulty of—FRAGEN.

[9755].—**Baywood.**—What is the difference between baywood and mahogany? I have consulted several people, some of whom say that baywood is a mahogany of a softer, lighter, and cheaper quality, whilst others say that it is a different species of wood, and not mahogany at all. An explanation will be esteemed a favour.—AJAX.

[9756].—**Salt Glazed Tubes.**—I shall be glad to learn the reason why salt-glazed fireclay flue linings and chimney-pots are liable to crack when subjected to great heat, and whether there is a remedy in mixing the clay, &c.—ONE IN A FIX.

[9757].—**Overhanging Trees.**—Where the land belonging to one person is overshadowed and covered by the overhanging branches and foliage of trees belonging to neighbouring property, has the one aggrieved a right to lop off the offending branches, or what other remedy is there to rid himself of the intrusion?—FAIRATION.

[9758].—**Wet in Cellar.**—A house built on a slope has a cellar which in wet seasons gets filled with several inches of water that rises through a brick flat floor with grouted mortar joints. The cellar is sunk in a shaley kind of rock, and when house was building sky-water was disposed of by sinking a pit (3ft. each way) and filling in same with rubbish. Would the wet come into cellar if this pit was filled in with cement concrete? But if this were done and the floor brick joints pointed with cement, might not the water force its way through the mortar joints of the 18in. stone cellar walls, which at present is not the case?—C. E.

[9759].—**Pantiles.**—What is the reason that pantiles are not more largely used? Can they not be relied upon to keep out a driving rain at a pitch of 45 degrees?—C. F. M.

[9760].—**House Drains.**—Where only a very slack fall can be obtained (say, 1 in 300), would not a 6in. drain be preferable to a 9in., and clear better?—SANITARY.

[9761].—**Red Building Stones.**—Will some readers kindly give their experience of the various red building stones used in London, and relative cost, &c.?—ENQUIRER.

[9762].—**Pressure on Dam.**—What will be the pressure per square foot on a vertical dam at 12ft. below surface of fresh-water reservoir? Please show method of walling.—CONSTANT SUBSCRIBER.

## REPLIES.

[9700].—**Quality of Woodwork.**—I am obliged by the trouble taken to answer my inquiry; but could some practical reader state the best wood to specify for some practical reader state the best wood to specify for a carpenter and joiner's work, separately if necessary, and a method to tell, if possible, when the right wood is being used for ordinary purposes, so as to have clean, sound, and stable work? I should also be glad by a closer attention to the latter part of my inquiry as to carpenter and joiner's work being kept entirely free from sapwood, and shakes, and large knots, and all other defects. Is there such a thing for building purposes as wood entirely free, or should the clause be understood in carrying out work to be very or fairly free, and how is one to get over the difficulty when clients are quibbling as to paying for work on some slight defect natural to the wood revealing itself at completion of contract?—FAIRATION.

[9752].—**Highest Spires in South London.**—The three highest spires within the metropolis south of the Thames, are: (1) Christ Church (Rev. Newman Hall's), Westminster Bridge-road and Kennington-road, built 1875-6, from the designs of Messrs. Paull and Bickerdike; height of "Lincoln" memorial tower and spire attached to the church 220ft., square at base 29ft.; an illustration of the church and tower appeared in the BUILDING NEWS for Jan. 1, 1875, and details of entrance on Feb. 5, of same year. The central fleche of same church is 140ft. in height. (2) St. Giles's Parish Church, Camberwell; rebuilt 1841-4 from designs by the late Sir Gilbert Scott and T. Moffatt; central tower and spire, 207ft. high, 30ft. square at base. (3) St. John the Divine, Vassall-road, Brixton, the late Mr. G. E. Street, R.A., architect; the tower and spire are now being added under Mr. A. E. Street's superintendence; the former, of red brick, is 108ft. high, and 25ft. square at base; the spire of stone, just commenced, will rise 104ft. higher, making total altitude from ground 212ft.—EAST ANGLIAN.

Surveyors have been busy this week going over the route of a proposed new railway which will run from the Midland system between Ingrow and Cullingworth, and the railway near Preston on the southern side of the Ribble. The new line will connect the district of Colne, Sadding, Whalley, and Walton-le-Dale, and will be known as the North-West Central Railway. The engineers are Messrs. Henry James Fraser and Mr. Beswick Myers, Leeds and Westminster, and Mr. Samuel Utley, Halifax. The total length will be between 30 and 40 miles.



### WATER SUPPLY AND SANITARY MATTERS.

**CARDIFF.**—The mayor and corporation proceeded on Friday to the Taff Fawr Valley in order to make the annual inspection of the new waterworks now being erected in that district. The party, under the guidance of Mr. J. A. B. Williams, the waterworks engineer, inspected the whole of the workings, noting the progress that had been made since the last visit, fifteen months ago. This, it is stated, was thought somewhat slow, especially as the time stipulated in the contract expires next January. The advance made since the former visit is that the discharge tunnel has been completed, and the river has been so diverted as to run through the tunnel. This was all finished in September last. The main trench across the valley has been proceeded with, the excavations in this case being very formidable, from the fact that a great amount of cutting has to be done before getting at water-tight material. This trench has been completed on the western side of the tunnel, and attention for the most part is now being directed to the eastern side. In addition to the trench on the east side, a bye-wash and an overflow weir will have to be made. These, with the embankment, are the most important items in the work remaining to be done.

**SOUTH AFRICA.**—The De Beers Consolidated Mines (Limited) obtained a Bill during the recent sitting of the Cape Parliament for the construction of a scheme for the supply of water to the Township of Beaconsfield (adjoining Kimberley) and the adjoining mines of the locality. The supply will be about one million gallons per day, which will be pumped from the Vaal River, a distance of 14 miles, to a service reservoir near the town, which will contain ten days' supply. The total rise from the river to the reservoir will be 500ft., and a head of water of about 100ft. will then be afforded to the distribution for mines and municipal purposes. Mr. Sydney Stent, M.Inst.C.E., is the engineer of the scheme, and his estimate of cost is about £140,000, which will include a perfect scheme of filtering for the municipal supply. The opposition of the Kimberley Waterworks Company to the Bill was most persistent all through its several stages in both Houses, and its final passing was only accomplished a few hours before the proroguing of Parliament.

**WOLVERHAMPTON.**—The chairman of the Corporation Sewerage Committee laid on Thursday, the 13th inst., a memorial stone at the Barnhurst Sewage Farm in connection with the precipitation works which are being executed there for the purpose of purifying the sewage of the borough, and thereby avoiding the claims made upon the corporation for compensation for injury done to land and crops adjoining the Pendeford Brook, into which the effluent from the sewage farm falls. The most serious difficulty which the committee have had to contend with has been the spent acid and other waste refuse which have been sent down the sewers from various works in the town, and in order to neutralise the injurious effects of the acid the sewage will be mixed with milk of lime before being passed into the precipitation tanks, where it will be dealt with on the quiescent and continuous system. The works are being carried out from plans by Mr. R. E. W. Berrington, the borough engineer, at a cost of £5,600, Mr. Herbert Holloway being the contractor.

A serious slip has occurred in the north wall at the deeper water dock now constructing at Southampton. The wall, which is of concrete, is 850ft. long and 30ft. thick at the base, and about 300ft. run of this has been pushed bodily forward by lateral pressure, the wall itself remaining upright and virtually intact. Mr. Alfred Giles, M.P., engineer to the Dock Company, was telegraphed for, and under his instructions the contractors, Messrs. Pearson, are relieving the pressure on the damaged wall by the removal of the backing so as to prevent the mishap extending.

On the 9th inst. the R.C. Archbishop of Glasgow opened a new Catholic school situated on the west side of Sandfaylls-street. The building was designed by Messrs. Pugin and Pugin, of Westminster. Red sandstone, with rock facing, is used for the front of the building, and vitrified bricks are the material put into the gables and back portion. The school is 116ft. long and 34ft and 76ft. in height. The contract price for the building, which accommodates 1,300 children, was £5,000.

At a meeting of the Crediton School Board, held on Tuesday, Sept. 11th, it was proposed to erect new schools at Hookway, Crediton, and Mr. Charles Cole, M.S.A., of Exeter, the architect of the school recently opened at Coplestone, was instructed to prepare plans for the approval of the Board.

The parish offices, Dudley, are warmed and ventilated by means of Shorland's patent Manchester grates, supplied by Mr. E. H. Shorland, of Manchester and London.

### STATUES, MEMORIALS, &c.

**DUNDEE.**—On Saturday afternoon the Primus dedicated a new marble credence table, piscina, and aumbrey, which has been erected on the south wall of the sanctuary of St. Paul's Episcopal Church, Dundee, in memory of the late Sister Margaret Mary of St. Mary's Sisterhood, King-street. The memorial has been executed by Messrs. Farmer and Brindley, sculptors, London. It consists of a shelf of red Irish marble, which is divided into two recesses, the eastern forming the credence table and the western the piscina with an aumbrey attached. It is inclosed with slabs of alabaster, and an oak door having ornamental hinges of wrought iron. The canopies are formed of polished alabaster, beautifully veined and carved with foliage and marguerites, under which is an inscription.

**EDINBURGH.**—THE HARRISON MEMORIAL.—The Earl of Rosebery formally inaugurated, on Friday, at the east entrance to Blackford Hill, the arch erected as a memorial of the late Sir George Harrison, M.P., LL.D. The gateway, which was designed by Mr. Sydney Mitchell, architect, is Classic in style. In the centre is an archway for carriage traffic, 13ft. wide and 17ft. high to the crown. This is flanked on each side by two Ionic columns standing on pedestals, and between these columns two small archways, 4ft. wide and 9ft. high, are pierced for foot passengers. At the level of the spring of the large centre arch the gateway is divided horizontally by a moulded string, and the gateway is finished at the top with an architrave, frieze, and cornice. The cornice is broken above the capitals of the columns, and over the central pair of these rises a triangular pediment. In the space contained in this pediment is a moulded circular panel, in which is a bronze medallion of Sir George Harrison, by Mr. M'Bride, sculptor—the face being a replica of the bust in the Council Chambers, Edinburgh. The whole gateway measures 36ft. in length, and 30ft. high. On the frieze over the central archway, and just underneath the medallion, is carved the inscription.

### CHIPS.

Messrs. Hayward Tyler and Co., of 84, Whitecross-street, London, E.C., now undertake the complete fitting-up of private houses, public buildings, factories, &c., with the electric light. The department is under the charge of Mr. C. P. Hammond, an experienced electrician, and they will be glad to receive inquiries from parties requiring such work done.

Mr. Sydney Stent, F.R.I.B.A., of Kimberley, S.A., has been commissioned to design a new cathedral for Pretoria, the capital of the Transvaal Republic. The total cost will be about £20,000, but it is probable that only a portion of the complete design will be carried out at present, and such portion will be adapted for use in connection with the present pro-cathedral.

On Monday last Mr. J. Edwards was elected curator of the Royal Architectural Museum, in the place of Mr. Edgar Varley, deceased. Mr. Edwards was for 25 years an assistant in the offices of Messrs. Slater and Carpenter. There were several candidates for the post.

A large clock, striking hours, chiming the Westminster quarters, and showing time on two large dials, has just been erected at Willey Park, Shropshire, to the order of Lord Forester, by John Smith and Sons, Midland Clock Works, Derby. It is fitted with all the latest improvements, and is expected to go with extreme accuracy.

All the French national museums—viz., the Louvre, the Luxembourg, Versailles, and St. Germain—together with all objects of art in State buildings throughout France, have just been placed under the charge of a single director, whose headquarters will be at the Louvre.

The gifts of Sir John Savile to the National Gallery are now on view. They consist of No. 1255, "Still Life," by Jan Van de Velde; 1256, "Still Life," by H. Steenwyck; 1257, "The Birth of the Virgin," a sketch by Murillo; and 1258, by Jean B. S. Chardin. The copies of Velazquez's works are hung in the basement at Trafalgar-square.

Among the adjudications in bankruptcy announced in Tuesday's *Gazette* the name occurs of Sydney Birbeck, Nottingham, architect and surveyor.

The foundation-stone has been laid at Tralee of a new church of St. James. The building will be Early English in character, and will consist of nave with aisles, transepts, and chancel, and a future day a tower and spire, rising to a height of 150ft., will be added. Accommodation is to be provided for 1,600 persons at a cost of £7,000. Mr. R. Devlin, M.A., of Dublin, is the architect.

The partnership between Sage and Oxley, of Gray's Inn-road, builders, has been dissolved.

### Our Office Table.

THE picturesque 12th-century ruins of the Clunian Abbey of Kirkstall, now within suburban Leeds, have been in the market for some time, and fears have been entertained lest some wealthy and ignorant cloth manufacturer should purchase the remains and vigorously restore or possibly demolish them. The present owner, the Countess of Cardigan, has thrown out the hint that some man of means should buy them and convert them into a cathedral for Leeds; happily, however, the well-to-do and shrewd Churchmen of the district have not jumped at the suggestion. A paragraph went the round of the papers a few weeks since stating that Sir John Lubbock had acquired them; but this proved unfounded. We are glad to hear that the ruins will probably be obtained for the town—a syndicate of local gentlemen having formed themselves into a committee with the object of purchasing the estate, with the view of its being subsequently acquired by the town, or settled under some other disinterested trust, under provision that would secure the necessary steps being taken to stop the further destruction of the abbey, to provide for its protection and maintenance in future, and to insure the dedication of the abbey and grounds to the use and enjoyment of the public for ever. The committee has opened negotiations for the purchase of the estate, and one of its members has engaged to advance the necessary money if terms of purchase can be agreed upon.

The first annual exhibition of the South Wales Art Society, established some eight months since mainly through the energy and zeal of Mr. Edwin Seward, R.C.A., was opened at Cardiff on Saturday. The collection, which is hung in the Queen-street Public Hall, is an excellent one for an initial effort, and numbers several hundred oil-paintings, water-colour drawings, and pencil sketches. The place of honour is occupied by H. Stacey Marks's portrait of Sir Morgan Morgan, the ex-Mayor of Cardiff, and below it is hung a water-colour scene from the Highlands, by Walter Severn, a vice-president of the society. H. Clarence Whaithe, P.C.A., sends two Snowdonian landscapes. The oils include works by G. F. Watts, James Sant, and Seymour Lucas; Welsh landscapes by B. Williams Leader; some figure subjects by J. D. Watson; Jackson Curnock's strongly coloured sketches; and those by T. H. Thomas, Alfred de Breanski and Albert Stears are worthy of notice. Architectural sketches and drawings are contributed by E. Seward, S. W. Williams, E. H. Bruton, C. C. Jones, and Habershon and Fawcner. The chief exhibitors of sculpture are Milo Griffith, H. Hampton, and W. Gascombe John.

THE death is announced at the comparatively early age of 38 years of Mr. James Stafford Murchie, the active secretary of the Amalgamated Society of Carpenters and Joiners. Mr. Murchie, who died at his residence in Brunswick-street, Manchester, on Wednesday in last week, was born in Carlisle, and at an early age removed to Manchester, where he was put to the trade of a carpenter and joiner. Being of a studious habit, he soon made a considerable acquaintance with literature, and gave special attention to all questions affecting the working classes. At an early age he was firmly convinced of the value of organisation as a means of enabling the men of his own order to hold their own in the contest with capital. He actively engaged in the society connected with his own trade, and in 1876, although only 26 years old, he was appointed chairman of the committee which conducted the memorable strike of that year. The movement was a failure, and Mr. Murchie and other prominent actors in it suffered much in consequence. On the appointment of Mr. J. D. Prior as factory inspector in May, 1880, Mr. Murchie, who at that time held the office of chairman of the Executive Council of the Amalgamated Society of Carpenters and Joiners, was elected to the office of secretary vacated by Mr. Prior, and was subsequently re-elected each year. The great depression which has prevailed during his term of office has caused a very heavy drain upon the funds of the society, and furnished considerable reason for anxiety on the part of



responsible officers. Mr. Murchie bore his part in this work with an unflinching cheerfulness, and a brighter day seemed to be dawning at the time of his fatal illness. Last week he attended the Trade-Unions Congress at Bedford, and in moving a resolution on the players' Liability Bill spoke with his usual force and fluency; and he also spoke later in the week, when the usual severe competition took place for seats on the Parliamentary Committee, and when he was elected sixth on the list out of 24 candidates. The funeral took place at Ardwick Cemetery, Manchester, on Saturday, and was attended by the chairman and all the members of the executive council, Mr. George Shipton, president of the Trade-Unions Congress, Mr. Slatter, the treasurer, and other representative trade-unionists from parts of the country.

THE medical officer of health has within the last two months condemned as unfit for human habitation some wretched and squalid tenements in Windsor, situated in the Oxford-road; and last week some more of the demoralising type in Distil House-row, a court adjacent to Thames-street and the Curfew Tower. In the latter "slum," which is situated within 100 yards of Windsor Castle, a fatal case of diphtheria has just occurred. Events are thus at once vindicating the efforts which the Rev. Arthur Robins has been making for years past to deliver Windsor from the stigma and danger of dwellings which are tardily pronounced, officially, to be unfit for human habitation. Is it too much to hope that, for Windsor's good name and prosperity, this is the beginning of the end "of these horrible and heartrending homes"?

A PUBLIC meeting of those interested in the expediency of registering plumbers, was held in the Town Hall, Stockton-on-Tees, on Friday evening. The Mayor occupied the chair, and was supported by Professor Garnett, Principal of the Durham College of Science, and Mr. L. I. Armour, Secretary of the District Council. The Mayor, in opening the meeting, said that the proposed society was not formed in the interest of the trade, but to promote public health, and with the view of placing the plumbing craft on a higher basis, and also to provide a better class of workmen. What was required in sanitary matters, so far as plumbing was concerned, was not to have cheap work, but to have really good and efficient work. Mr. Armour stated what had already been done in Newcastle-on-Tyne. Councillor Hind, the Master of the Plumbers' Guild, explained the object of the society. Professor Garnett said that bad and defective plumbing were caused not so much from want of honesty as from the want of the knowledge required to carry out the work satisfactorily. Mr. Ald. Cragg was elected the public representative of the society for Stockton; Messrs. Jno. I'Anson and Geo. Simpson were appointed representatives on behalf of the operatives; and Mr. John Swain was appointed the masters' representative.

A GATHERING of the Fellows of the Surveyors' Institution, resident in the counties Palatine of Lancashire and Cheshire, was held in the meeting-room of the Manchester Society of Accountants on Tuesday to further the formation of a provincial committee of the Institution for the two counties on the basis of the scheme for the local organisation of members throughout the provinces, which is in course of gradual development by the council. The secretary of the Institution explained in detail the constitution of the new committees, and the objects the council have in view in their formation. Mr. J. Cross, of 77, King-street, Manchester, to whose hands the preliminary arrangements were confided by the council, was unanimously elected chairman of the committee for the ensuing year. In the exercise of the discretion vested in the meeting by the rules of procedure, it was resolved that the committee be designated the "Provincial Committee of the Surveyors' Institution for the Counties Palatine of Lancashire and Cheshire." After the completion of the formal business of the meeting, the committee proceeded to consider the arrangements for the preliminary examination for the admission of students to the Institution, to be held at Manchester under the auspices of the committee on the 22nd and 23rd of January next, Messrs. J. Holden, T. Silk Wilson, S. J. Bridgford, and T. A. Dickson being appointed moderators for the purpose.

## CHIPS.

An organ which has just been placed in Partick parish church, Glasgow, was inaugurated on Sunday. It was built by Mr. J. J. Binns, of Bramley, Leeds, and cost £700.

A sub-committee of the Edinburgh town council has recommended that body to invite models in competition for the statues of Wallace and Bruce proposed to be erected in that city on the Princess-street Esplanade. The intended outlay on the statues is £3,000, and no premiums will be given in the competition.

A mission chapel and keeper's house for the Welsh Calvinistic Methodists were commenced a few days ago at Garston. Mr. Joseph Rawlinson, of Wellington-street, is the sole contractor, and the works are being carried out under the supervision of Mr. Frederick H. Peate, of Liverpool.

New police buildings have been erected at Francis-street, Westminster, and special attention has been paid to the ventilation, Messrs. Robert Boyle and Son's latest improved patent self-acting air-pump ventilators being adopted for the extraction of the vitiated air.

The annual exhibition of architectural photographs taken by Mr. John L. Robinson, A.R.H.A., of Dublin, illustrative of the A.A. excursion, will be opened on Monday next, the 24th inst., at the Royal Architectural Museum. The series of views number between one and two hundred.

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## TENDERS.

\* Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

AXMINSTER.—For alterations to the Red Lion Hotel, for Messrs. S. and W. T. Toms, brewers, Chard. Messrs. Pinney, Son, and Farmer, Axminster, architects:—Parsons and Perryman, Axminster ... £68 1 6

BERMONDSEY.—For alterations at the Claremont, Upper Grange-road, for Mrs. Whitlock. Mr. H. W. Budd, 76, Vincent-square, S.W., architect:—  
Cooks ... £325 0 0  
Bull ... 295 0 0  
Lamble ... 289 0 0  
Prestige and Co. ... 260 0 0  
Strawbridge ... 236 10 0

BOSTON, Lincs.—For the erection of a cattle shed on the East Fen Estate, for the town council:—Parker and Hinds (accepted) ... £105 0 0 (Lowest of 11 tenders received; the highest being £205.)

CHATHAM.—For emptying cesspools and removing refuse during three years, for the local board of health:—  
Angel G.... £850 0 0  
Driver, J. (accepted) ... 675 0 0

CHATHAM.—For the repair of the Sun Pier, for the local board of health:—

Thames Ironworks Co. ....	£850 0 0
Shaw and Co. ....	510 0 0
Westwood, Bailey, & Co. (accepted) ...	430 19 8
Engineer's estimate, £437 6s. 2d.	

CAMDEN TOWN.—For the erection of banking premises at High-street, Camden Town, for the Alliance Banking Co., Ltd. Mr. F. Pinches, architect. Quantities by Messrs. T. Thornton, Green, and Pietersen, 12 and 13, Poultry, E.C.:—

Lamble ...	£8,769 0 0
Wall, C. ...	8,722 0 0
Dixon ...	8,700 0 0
Colls and Sons ...	8,434 0 0
Cox, C. ...	8,398 0 0
Drew ...	8,384 0 0
Patman and Fotheringham ...	8,303 0 0
Morter ...	8,300 0 0
Patrick, M., and Son ...	8,270 0 0
Grover and Son ...	8,248 0 0
Toms ...	8,039 0 0

CHELMSFORD.—For the erection of a Vestry Hall in New-street, for the parish officers. Mr. F. Whitmore, architect:—

Potter, H. ...	£476 0 0
Baker, C. J. ...	456 0 0
Roper, A. ...	455 0 0
Beaumont, G. ...	432 0 0
Moss, Mrs. ...	429 0 0
Fingham, W. ...	419 0 0
Johnson, F. ...	377 0 0

\* Accepted, from revised plans.

EDINBURGH.—For repairs to the poorhouse hospital, for the city parochial board:—Rendall and Pottinger (accepted) ... £189 14 8

ELGIN.—For the erection of an auction mart, for the Elgin Auction Mart Co., Ltd. Mr. C. Doig, architect:—  
(Accepted tenders.)

Carpenter:—	
Ross, J., Bishopmill ...	£223 0 0
Mason:—	
Jamieson, W. ...	83 0 0
Slaters:—	
Wilson, J. ...	59 17 0
Plumber:—	
Hunter, J. ...	39 17 0
Ironwork:—	
Law, W., and Co. ...	21 10 6
Painters:—	
Kintred, J., and Son ...	15 15 0
Rest of Elgin.	

EXETER.—For new roofs and general repairs to twelve cottages and the Hermitage, &c., at Heavitree. Mr. C. Cole, M.S.A., Queen-street Chambers, Exeter, architect:—Tree and Boley, Exeter (accepted). (Lowest of five tenders received.)

EPSOM.—For additions and alterations to workhouse, Epsom, Surrey, for the guardians. Mr. H. W. Appleton, F.R.I.B.A., architect. Mr. F. W. Miller, quantity surveyor:—

Seal ...	£10,250 0 0
Parker ...	9,949 0 0
Clarke and Bracey ...	9,639 0 0
Knights, H. ...	9,465 0 0
Bricknell, A. ...	9,290 0 0
Shillitoe and Son ...	9,250 0 0
Taylor ...	9,250 0 0
Stephenson, G. ...	9,137 0 0
Goddard and Son ...	9,136 0 0
Rose and Co. ...	9,148 0 0
Wyatt, F. ...	8,920 0 0
Willcock, H. ...	8,885 0 0
Burnand, E. J. ...	8,642 0 0
Ward Bros. ...	8,604 0 0
Wood, R. ...	8,583 0 0
Martin, J. ...	8,565 0 0
Longley, J. ...	8,400 0 0
Flew, A. R. ...	8,290 0 0
Howe and White ...	8,250 0 0
Lowden, W. H., and Son ...	8,250 0 0
Ward, Clarke, and Co. ...	8,167 0 0
Chappell, J. ...	8,146 0 0
Simmonds, W. H. ...	7,991 0 0
Humphris, R. J. ...	7,700 0 0
Tarrant, H. ...	6,982 0 0

FULHAM.—For building river wall and embankment at Swan Wharf, Fulham Bridge, for Mr. T. W. Bowden, Royal Brewery, Chelsea. Mr. A. C. Beans, C.E., Shepherd's Bush and Hanwell, engineer:—

Nowell and Robson ...	£2,040 0 0
Mears, J. ...	1,946 0 0
Cooke and Co. ...	1,500 0 0
Williams, Son, and Wallington* ...	1,500 0 0

\* Accepted.

GRANTHAM.—For paving works in St. John's-street, for the town council:—Hilliam, W. (accepted) ... £33 5 0

GRIMSBY.—For building new cemetery, chapels, lodge, mortuary, and waiting-room, for the Grimsby Corporation, Mr. E. W. Farebrother, F.R.I.B.A., Grimsby, architect:—

Shillitoe & Sons, Bury St Edmund's ...	£4,590 0 0
Smith, W. ...	4,400 0 0
Leaning ...	4,338 0 0
Grant, F., Cleethorpes ...	4,330 0 0
Southern, F., Exors, Hull ...	4,375 0 0
White, J. ...	4,350 0 0
Roebuck and Gooseman ...	4,150 0 0
Goodhand, Hewins, and Co. ...	4,144 6 4
Guy, J. and R. G. ...	4,144 0 0
Walker and Cook ...	4,126 0 0
Good and Co., Hull ...	4,070 0 0
Enderby and Co. ...	4,066 0 0
Wortley, Doncaster ...	3,995 0 0
Simonson, T. ...	3,929 0 0
Crossland, Newark ...	3,800 13 0
Thompson, J. M., and Sons, Louth* ...	3,787 0 0

\* Accepted.

Rest of Grimsby.



**FULHAM.**—For stables, superintendent's house, &c., in Munster-road, for the Fulham Vestry. Mr. J. P. Norrington, architect. Quantities by Mr. F. H. A. Hardcastle :—

Temple and Graham	£7,200 0 0
Longley	6,965 0 0
Henley and Co.	6,924 0 0
Woodhouse	6,576 0 0
Foster and Dicksee	6,333 0 0
Boller	6,320 0 0
Higgs	6,250 0 0
Richardson, J. O.	5,919 0 0
Ashford	5,580 0 0
Nye	5,417 0 0
Brickell	5,249 0 0
Flew, A. R., and Co. (accepted)	5,158 0 0

**HAVERHILL, SUFFOLK.**—For the erection of new Corn Exchange, for the Board of Directors. Mr. F. Whitmore, Chelmsford, architect :—

Everett and Son, Colchester	£1,473 0 0
Orfeur, C. E., Colchester	1,398 0 0
Grimwood and Son, Sudbury	1,395 0 0
Mason and Son, Haverhill	1,329 0 0
Dupont, T., Colchester	1,275 0 0
Diss, A., Colchester (accepted)	1,250 0 0

**HESWALL, CHESHIRE.**—For the erection of house, for the Rev. J. Fox. Mr. J. W. Auger, Liverpool, architect :—

Kitchen, J. F.	£640 0 0
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(No competition.)

**HEREFORD.**—For stuccoing the Cattle Market Tavern, for the city council :—

Watkins, J. (accepted)	£41 10 0
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**HIGHGATE, N.**—For pointing brickwork at the Highgate Infirmary, for the Guardians of Holborn Union :—

Banford, Holborn	£1,250 0 0
Lilly, Pall Mall	855 0 0
Sherwood, Leyton	745 0 0
Wall Bros., Kentish Town	737 0 0

(Consideration of tenders deferred for six months.)

**HIGHWORTH.**—For new shop-front, &c., High-street, Highworth, Wilts, for Mr. G. Yeates. Mr. W. Drew, M.S.A., 22, Victoria-street, Swindon, architect :—

Thomas, J., Highworth (accepted)	
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**HURST.**—For the erection of a dwelling-house, Turner-lane, Hurst, for Mr. S. Sidebottom. Mr. J. H. Barton, Ashton-under-Lyne, architect :—

Clough, W.	£445 0 0
Whitnough, J., Hurst	444 10 0
Williamson, J. W.	438 0 0
Gibson, J., Dukinfield	416 0 0
Tiekle, W., Dukinfield	414 10 0
Fitton and Bowness	414 0 0
Garside, J.	411 0 0
Morris, C.	399 0 0
Dean, T.	385 0 0
Holmes, A.	385 0 0
Robinson, J. (accepted)	385 0 0

Rest of Ashton-under-Lyne.

**HOLYWELL.**—For carrying out works in connection with the Rhewl Mostyn water supply, for the Holywell rural sanitary authority :—

Parry, Morris, and Jones, Holywell and Ffynnonogroew (accepted)	£435 0 0
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**LANDPORT.**—For the rebuilding of No. 198, Commercial-road, Landport, Portsmouth, for Messrs. Bishop Bros. Messrs. Inkpen and Stallard, 6, King's-road, Southsea, architects. Quantities supplied by the architects :—

Ward, W., Fratton	£1,550 0 0
Evans, H. J.	1,499 15 0
Crockerell, J., Landport	1,479 0 0
Lewis, D. W.	1,455 5 0
Light, W. R. and C., Landport	1,445 0 0
Corke, H. J.	1,355 0 0
Quick, J. W.	1,297 0 0
Hall, T. P. (accepted)	1,250 0 0

Rest of Southsea.

**LEOMINSTER.**—For new gas-manager's house, for the Gas Co. Mr. E. H. Lingen Barker architect :—

Edwards, C., Leominster (accepted)	
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**LONDON.**—For medical residential college, for Guy's Hospital. Messrs. Wood and Ainslie, architects :—

Shillitoe, J., and Son, Bury St. Edmund's (accepted)	
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**MEMBURY, NEAR CHARD.**—For the erection of a teachers' house, for the Membury School Board. Messrs. Pinney, Son, and Farmer, Axminster, architects. Quantities by the architects :—

Parker, H., Seaton	£430 0 0
Turner and Skinner, Honiton	425 0 0
Berry, W. T., Honiton	410 0 0
Parsons and Perryman, Axminster	406 10 0
Hill, F., Chard	385 0 0

\* Recommended for acceptance.

**MORETONHAMPSTEAD, DEVON.**—For additions and improvements at the New London Inn. Mr. C. Cole, M.S.A., Queen-street Chambers, Exeter, architect :—

Farker and Coleridge (accepted)	
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(Lowest tender received.)

**NEWMARKET.**—For building the infectious hospital, cottage, &c., for the rural sanitary authority of Newmarket Union :—

Turner, T., Cambridge	£2,598 0 0
Cave, H., Peterborough	2,045 12 0
Reading and Son, Cambridge	1,950 0 0
Blyth and Hunt, Newmarket	1,917 2 6
Kent and Holland, Newmarket	1,916 0 0
Arber, R., Newmarket	1,864 0 0
Plummer, Rattlesden, and Hook, Soham	1,788 0 0
Linsell, H. S., Newmarket	1,694 0 0
Ooulson, H. C., Cambridge	1,665 0 0
Banard, P., Cambridge	1,602 10 0
Cowell and Son, Soham	1,552 0 0
Kidman, C., Cambridge (accepted)	1,428 6 0

**PITSEA, ESSEX.**—For the erection of the Bull Inn. Messrs. Crabb, Veley, and Co., Great Baddow. Whitmore, Chelmsford, architect :—

Diss, A., Chelmsford (accepted)	£620 0
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**READING.**—For the erection of two detached houses, Berkeley-avenue, Reading, for Mr. J. B. Monck. Messrs. Cooper and Son, Blagrove-street, Reading, architects. Quantities by the architects :—

Ruffell, Bros.	£960 0
Winter and Fitt	887 0
Bottrill, J.	885 0
Pilgrim, T.	880 0
Lewis, G.	845 0
Collier and Catley	839 0
Goodchild, W.	759 0
Poffley, W.	710 0

All of Reading.

For laying main sewer and constructing manholes the above :—

Collier and Catley, Reading (accepted)	£25
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**SEAFORD.**—For convalescent home, for Mr. A. E. Mr. Ewan Christian, architect :—

Shillitoe, J., and Son, Bury St. Edmund's (accepted)	
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**SOUTH SHIELDS.**—For the Westoe-road Board South Shields, Mr. J. H. Morton, F.R.I.B.A., architect :—

Goodwin, R., and Son, South Shields	£16,984 0 0
Middlemiss Bros., Newcastle	16,472 0 0
Young, J., Tyndock	15,585 0 0
Scott, W., South Shields	15,581 0 0
Vinton, J., South Shields	15,485 0 0
Douglass, J., Cullercoats	15,312 0 0
Summerbell, R., Tyndock	15,267 0 0
Ranken, D. and J., Sunderland	15,235 0 0
Fortune, T., North Shields	15,212 0 0
Marshall, P., South Shields	15,136 0 0
Weir, J. B., South Shields	14,949 0 0
Lowry, J. and W., Newcastle	14,709 0 0
Lawes, D., and Co., South Shields	14,595 0 0
Lumsden, T., Jarrow	14,459 0 0
Kilburn Bros., South Shields	14,347 0 0
Scott, W., and Son, Sunderland	13,980 0 0
Anderson, E., South Shields	13,846 0 0
Elliott, J., North Shields	13,840 0 0
Allison, R., Whitburn	12,994 0 0
Pigg, T., South Shields	11,710 0 0

\* Accepted.

**SWINDON.**—For pulling down No. 24, Wood-street, Swindon, and erecting new business premises. Mr. Drew, Swindon, architect :—

Williams, J., Swindon (accepted)	
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**TUNSTALL, STAFFS.**—For the erection of (a) the school of art, (b) public baths, and (c) a town yard, for the board of health :—

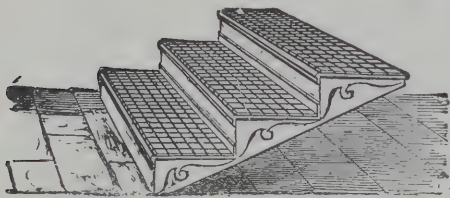
Goodwin, T., Tunstall (accepted)	(a) £4,135 ; (b) £3,890 ; and (c) £927.
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Accrington	Dublin	Earl's Court	Kensal Green	mouth	Soho	Whitechurch	Police Barracks	Belfast Method-	grave Road
Acton Green	Bardett Road	Edgware Road	Kentish Town	Moorgate-street	South Bromley	Whitechapel	Eastney	ist College	Stratford, S.
Aldersgate-street	Barcough	Failsword	Kilburn	Monument	South Kensington	Whitefield	Fleetwood	Battersea, St.	way Place
Alford Park	Burton	Farringdon	Kilby	Newcastle-	ton	Whitley	Fulwood	Mary's Church	Sutton
Altrincham	Bury	Street	King's Cross	under-Lyme	Southport	Widnes	Halifax	St. Jude's	Tayport
Aston	Borough Road,	Fenchurch	King William	New Cross	Speke	Willenhall	Hamilton, Glas-	Cowper Street	Torrington
Ash Street,	Mersey Tunnel	Street	Street	Newport	Spring Grove	Bridge	gow	Clapham	Upton Cross
Stockport	Canonbury	Finchley Road	Langley Green	Newton Heath	Stepney	Willesden	Hulme	Colchester	Wandsworth
Birmingham,	Camden Road	Lea Bridge	Latimer Road	North Brentford	Stechford	Wood Green	Knightsbridge	Forest Gate	Hospitals
New Street	Chalk Farm	Forest Gate	Leamington	North Bridge	Stoke	Wormwood	Leicester, Glen	Hanway Place	Belfast Cent.
Banbury	Charring Cross	Forest Road	Leman Street	Northampton	Stourbridge	Scrubs	Parva	Harrow	Lunatic Asyl.
Barnsby	Cheddington	Level Crossing	Leyland	(Castle Station)	Stratford	Wolverhampton	Manchester	Newcastle-on-	Orphan Work-
Barnsby	Cheetham Hill	Fulham	Leyton	Nottingham	Sudbury	Wolverton	Newbridge	ing School	Greenwich In-
Barnsley	Junction	Geedley	Leytonstone	Oldbury	Sunderland		Neuromant	Jamaica Level	firmly
Bedford	Chequerbent	Lichfield	Limehouse	Oldham (Mumps)	Sutton		Northampton	Leyton, Gram-	Guy's Hospital
Bedminster	Clayton	Gower Street	Lincoln	Paddington	Coldfield		Norwich	mar School	Lincolnshire
Becont Junction	Clifton	Grantham	Little Baling	Patricroft	Lyne		Portsea	Leyton, Church	County Asylu
Birmingham	Clitheroe	Greenwich	Liverpool Road,	Penzance	Thornton		Portsmouth	Road	Middlesex Coun
Blackfriars	Crews	Hackney	Manchester	Pickle Bridge	Torquay		Preston	Norhaven	ty Lunatic
Blackfriars	Crooked Billet	Haggerston	Hammersmith	Plaistow	Tower of London		Regent's Park	Old Bow	Asylum
Blackfriars	Level Crossing	Heaton Park	Hereford, Barr's	Pleek	Tring		Salford	Old Ford	Nedley Hospita
Blackfriars	Cross Lane	Liverpool Street	Court	Plymouth	Tynemouth		Shorncliffe	Poplar, Byron &	Peterborough
Blackfriars	Crumpsall	Llandudno	Highbury	Poplar	Upton Park		Trim	Bright Streets	Infirmary
Blackfriars	Cullercoats	Londoun Road	Highdran Road,	Portsmouth	Victoria Park		Winchester	Church Path	Rubery Asylum
Blackfriars	Cannon Street	Ludgate Hill	Walsend	Prethwich	Walham Green		Woolwich	Southsea, Omega	Northfield
Blackfriars	Daubhill	Mark Lane	Hollinwood	Radcliffe	Walsall		Wrexham	Street	St. Thomas's
Blackfriars	Daybrook	Manchester, Ex-	Holyhead	Road	Waterloo,				Hospital
Blackfriars	Denholme	change	Homerton	Salisbury Road	Liverpool				
Blackfriars	Derby	Manchester	Horley	Seething Lane	Waste				
Blackfriars	Droylesden	Manchester	Hounslow	Shadwell	Werneth, Old-				
Blackfriars	Drighlington	Manchester	Hounslow Bar-	Sheffield	ham				
Blackfriars	Dudley Port	Manchester	racks	Shoreditch	Westbourne				
Blackfriars	Dundee	Manchester	Keighley	Sloane Square	Park				
Blackfriars	Ealing Common	Manchester	Kemble Junction	Snow Hill, Bir-	West End Lane				
Blackfriars		Manchester	Milverton	tingham					

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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1760.

FRIDAY, SEPTEMBER 28, 1888.

## WORK AND WAGES.

THE prospects of winter in the building trades would be all the more hopeful if the relations between masters and men—generally rather strained during that season—were placed on a more satisfactory footing. The general tendency of the age is to increase the dominion of the contractor at the expense of the smaller builders. Sixty years ago the large firms of building contractors were almost unknown; buildings were undertaken by master men in their several branches, each of whom was apprenticed to his particular trade, and contracted for so much of the building as came within his knowledge. He employed other hands, often apprentices, to assist him in the work. The architect and surveyor undertook to bring these several tradesmen together, and to measure and value their work when finished. The men were paid weekly, whatever the weather, and were seldom discharged during a wet season, or were at the mercy of underbidders. This state of things has ceased to exist. The general contracting builder—possibly knowing little practically of the trades—undertakes all of them, employing his own workmen from the cheapest markets. The master tradesmen become foremen, or seek a precarious livelihood in small country towns. They have no longer the sole management of the trade in which they have been brought up, but have to superintend a number of trades about which they know little practically. The workmen are often unapprenticed, and are kept on only for their general usefulness, seldom for their mastery and skill as tradesmen. In fact, the whole system is to bring out and encourage jobbers and unskilled hands. The general complaint among skilled building operatives is that they have to compete with inferior workmen, who can work at lower wages. Was not this the burden of the answer to the recent inquiries made by the commission as to the depression in trade? The skilled artificer in one trade has less chance of constant employment than he who can turn his hand to several trades, who can not only lay floors and do ordinary joiner's work, but can mend a lead flat and look after drains. It is the "general hand" that is kept on in the workshops. Can we wonder at the dissatisfaction expressed by skilled operatives who have served their apprenticeships? This comprehensive system of contracting carried on by the large firm has seriously injured the prospects of the competent building operative. The only chance for the small master tradesman is to set up for himself, but this he cannot do without capital. The large firm stands in his way. What opportunity is there for a small tradesman or builder in a competition for tenders? He must associate with himself others who are masters of their trades, or engage an experienced foreman to conduct the work. The master tradesman who sets up as a small contractor has this disadvantage, that he is obliged to engage workmen in other branches of which he may know very little. The consequence is that the men are apt to impose on him—their master is not expected to know what quantity of work ought to be turned out in a day; there is overtime to pay for, and extra wages.

The state of things we have referred to has proceeded from the great contract system in which the builder is a capitalist, but by no means a workman. The master tradesman has given place to operatives who are all equal in skill, or are supposed to be so by

the rules of their societies. We miss the old master carpenter and mason and decorative plasterer such as Wren and Chambers knew, and which class of workman is still to be found in France. There we find, when a work is to be contracted for, a dozen small contractors are convoked by the architect, who is really the "master of the work." The *maçon*, the *charpentier*, the *menuisier*, &c., attend, examine each his own bill and drawings, and makes his own estimate of cost. The system is that of division of labour: the working tradesman is master of his own branch, and wholly responsible. No one can doubt that the most successful architectural eras were those when each master workman looked directly to the architect for guidance. When the contractor became the medium or intermediary between workman and architect, craftsmanship declined; and the decline has brought about one characteristic of our times—equality of workmen and wages. The equality principle has been enforced by trade-unions, for it must not be forgotten that trade-unionism is the offspring of the altered relations between masters and men. Taking the place of the old trade guild, its tactics are changed: no longer is proficiency in the trade a passport, but subscription to rules as to terms—wages, not skill, are now demanded.

The battle of Daywork versus Piecework has for years agitated the master and workman, and a great many good arguments can be adduced on each side. The workman and his advocates, who generally favour the rules of the trade-unions, protest loudly against piecework. They contend that the principle is inapplicable to many branches of building; besides which, the men are instigated by the masters, under it, to undercut and to compete with one another on terms that are unprofitable and injurious to each other; that the work so performed is scamped. As to overtime, the objection they urge to it is even more strongly founded. They think the workmen are right in resisting it, both on account of the physical exhaustion it entails from long hours, and the evils, moral and mental, the system leads to. It is urged that it is impossible to expect good work by overtime, which, it is alleged, is not only unprofitable to masters, but a curse to the men themselves. On the other hand, the master builders and a large number of architects contend for the principle of piecework. They deny that there is any trade in which it cannot be employed. We know several eminent building firms who not only advocate the system, but who employ a large number of men who work by piecework, and who are well satisfied with it. The leading builders agree with their opponents that piecework prices should be fixed at a fair rate to the men. We often hear it said that some kinds of building work, like brickwork, cannot be done by the "piece"; but there are many of the leading firms who carry out brickwork by this principle. Thousands of rods are let at so much per rod with the best result. Gauged work and cutting can be equally well done by the piece. The workman takes a whole façade or so many arches to cut, and he soon acquires a facility in doing this particular work, which he can do twice as well and quickly as another hand who may be engaged in promiscuous work half his time. To our mind the chief argument for piecework is that the artificer takes more personal interest in carrying out a work in its integrity from beginning to end, than when the same work is divided among a number of hands. The latter method of work is to break up the whole into fragments; each man does only a part of the work; he does not take the pains or the pleasure in the performance, but feels that he is but a machine in the accomplishment of a result which reflects credit only on the contractor. Let us take the joinery of a house or a church. By the system of daywork no one workman is responsible for the

result. It is divided among many, each does his share without responsibility; any little difficulty is solved by the foreman or clerk of works, the craftsman is not consulted, though he may have a better idea of doing it. But it is no duty of his to advise; he simply works by the day. The workman "by the piece" has to solve the matter single-handed—he can consult his own judgment, and feels some pride in turning out his work with credit. He contracts to do the whole, and he takes the responsibility of satisfying the architect, even if he spends a few extra hours. In mason's work the same system is found to answer well, and to give better results than day work. We are only speaking of those cases where there is no hurry, and where supervision is given. The most pernicious result of the system is when it is adopted by unscrupulous contractors, who require the work done as quickly as possible with little or no supervision. As a matter of course the men scamp the work, and try to get as high a wage as possible for it by turning it out as fast as they can. The masters employ no foremen, their principal object being to finish the work quickly. They let the brickwork to one man, the carpenters' and joiners' work to another, the slaters' to a third, the plasterers' to a fourth, and so on. The men seek to earn high wages, and the only way of doing so is to scamp. But the charge of "skulking" brought against workmen applies as much to both systems.

Does the workman of to-day perform as much work as his ancestor fifty years ago? Several competent authorities assert that he does not. We will not attempt here to argue a question which depends on so many conditions of labour; some classes of work require more time than others. We have heard it stated that the attention of workmen is in an inverse ratio to their earnings. Mr. Brassey, in his work on the labour question, has pointed to the want of skill and diligence as the main cause of increased cost of production; but he shows also that the capitalist is to blame for the indifference and want of energy of the workman. The tendency to separate or withdraw from the scene of labour, which we notice among successful employers and capitalists, is widening the breach between the two classes. That author plainly recommends more frequent and familiar interchange of thought between them, to break down the barriers which divide the different orders and conditions of men.

Some years ago a very interesting discussion on the subject of day and piecework took place, following a paper by Mr. Brassey at the Institute. At that meeting we remember the late Mr. Street, R.A., was in the chair, and pointed out, at the conclusion of the meeting, the injurious tendency of the rules of trade-unions in equalising wages. The tone of the remarks made on that occasion was clearly that a workman, if skilful, should not be restricted to one way of earning his wages, and that piecework was desirable from many points of view. Several well-known architects spoke in favour of the system which gave the working man his share in the production. We look forward to the day when this question will be settled, and when every skilled workman will participate in a fair proportion of the profits. It has been asserted that the workman has increased his wages within the last thirty years 44 per cent.; but capital has more than quadrupled this percentage during that time, and the question is, Should not the workman share in the increase? Technical education may some day re-establish the small master tradesmen, with direct benefit to all.

## THE RIGHT TO REDEEM A MORTGAGE.

A MORTGAGEE is entitled to hold the property mortgaged until his money is paid him. But until there is a sale or



foreclosure, there is an opposite right in the mortgagor, or his assigns, to redeem the property upon payment of that money. This is well known as the equity of redemption, and such an equity is, of course, capable of transfer by assignment upon sale; so that the assignee would be able to redeem the mortgage on complying with the usual conditions. Seeing, however, that a party may be interested in an equity of redemption without holding the whole right to redeem by formal transfer, the question has just been raised and decided as to whether or not this right to redeem is in law restricted to those who have a freehold interest in the mortgaged property. It seems strange that such a point should never have come before the Courts before, so as to create a precise precedent. It has now, however been decided by the Court of Appeal in the case of "Tarn v. Turner and Wilson" (*Times*, Aug. 1) that a lessee (even at a rack-rent) under a lease by the mortgagor, made after the date of the mortgage, is entitled, in case his lease is not recognised by the mortgagee, to redeem the mortgage. As this decision largely increases the value of property held by lessees of mortgagors, and upon which money has been expended in the way of improvements, and as a leading authority has now been at length laid down, it deserves careful consideration.

The facts were simple, and such as may, and indeed do, commonly occur in regard to house property. In 1881 the defendant Wilson mortgaged the freehold in question, and which consisted of a dwelling house and garden at Anerley, to the defendant Turner to secure £1,500 and interest. In 1885 Wilson agreed with the plaintiff to grant him a lease of the premises for 21 years, determinable at the end of the first 7 or 14 years, at a rent of £150 per annum. Under this agreement, which was in writing, the plaintiff entered into possession, and spent some £1,600 on improving the property. The defendant Turner, the mortgagee, was not aware of this agreement at the time of its execution; but he afterwards gave the plaintiff notice to pay his rent to him, which was done, though that would not amount to an acknowledgment of the tenancy. Negotiations were then entered into for the concurrence of Turner in the lease to be granted under the agreement with Wilson; but these fell through, because Turner declined to accede to the plaintiff's claim that the money he had laid out upon the property should be a charge thereon. The plaintiff then, as his only way out of the dilemma, brought this action, claiming specific performance of the agreement for a lease against both Wilson and Turner on the ground that Turner had by his conduct adopted that agreement, and so become bound thereby. He further claimed in the alternative, and as against Turner alone, that he might be allowed to redeem the freehold itself by paying off the mortgage. Mr. Justice Kekewich allowed this second claim, on the ground that, although there was no direct authority in favour of the plaintiff, yet neither was there any case in support of the defendant's view, that the right to redeem was restricted to those who had a freehold interest in the property. He therefore held that, on principle, the plaintiff was entitled to judgment for redemption of the freehold as against the defendant Turner, the mortgagee, and, upon appeal, this ruling has now been confirmed by the lords justices.

From the judgments in the Court of Appeal it is clear that the plaintiff was mistaken or ill-advised as to the first part of his claim. The mortgagee could not be bound by any contract entered into by the mortgagor subsequent to the mortgage to grant a lease of the property, unless it were clearly shown that he had assented to or acknowledged that agreement. This, however, he had not done, for taking rent of a tenant in

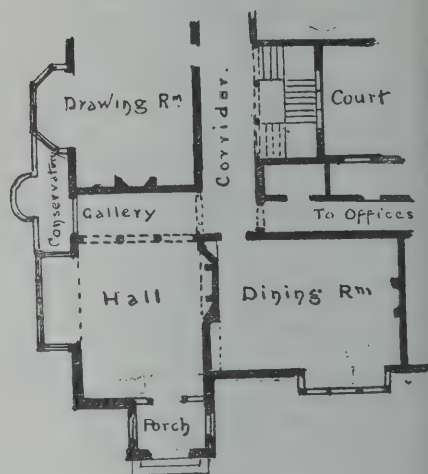
possession of mortgaged property does not amount to such an acknowledgment. The mortgagee had, in fact, declined to become the plaintiff's landlord according to the agreement with Wilson, and therefore there was no ground for the claim against him for specific performance, as to which the plaintiff's action so far failed. But upon the other claim, to redeem the property, the Court of Appeal gave judgment for the plaintiff. They put the point in this way: The agreement for a lease made by Wilson was practically the same thing as a lease, and so it was, in effect, a demise to the plaintiff which gave him an interest in Wilson's equity of redemption. It was long ago decided that a mortgagee has the right to eject the tenant of the mortgagor let in under a lease made since the mortgage and without his consent or ratification. In this state of things, Lord Justice Cotton asked why, then, should not the plaintiff, as tenant and as assignee, by demise from the mortgagor who was also owner of the equity of redemption, have the right to redeem the property as the only way of protecting himself against the exercise by the mortgagee of his right to eject him. The plaintiff was therefore entitled to all the rights appertaining to the owner of the equity of redemption, which, of course, included the right to redeem. Lord Justice Lindley put the points even more plainly, and thus showed their general importance. The plaintiff had agreed to become tenant of the mortgaged property from the mortgagor, and to take a lease from him. Unless he were allowed to redeem, he would be exposed to the risk of being evicted by the mortgagee. No distinction in law could be drawn between a person claiming as assignee by demise from the mortgagor, and one claiming as assignee of the property from him in any other way. The plaintiff, as lessee from the mortgagor, was a person interested in the equity of redemption, and therefore he was clearly entitled to redeem. Of course, as against the defendant Wilson as the mortgagor, the plaintiff would have been able to enforce specific performance of the agreement, and obtain a lease protecting him. But this was practically valueless as long as the mortgagee was able to turn him out of possession: so that the plaintiff's only sure way was to get rid of the mortgage by redemption. This he can now do: and thus a precedent has been created which may often be of great value to lessees who are similarly situated. It is satisfactory to find that our courts are so well able to deal broadly with points of principle, and to decide questions affecting property, free from technical trammels, and by the light of equity and fair-play to all the parties concerned in these complex transactions.

#### HALLS AND STAIRCASES.—VI.

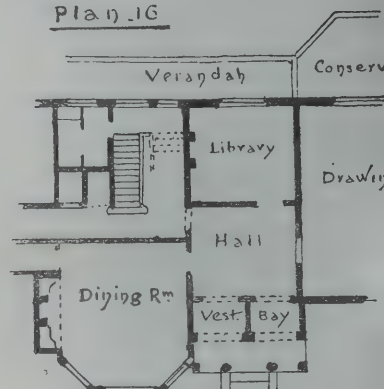
**B**EFORE we notice a few examples of public entrances which will serve to simplify the remarks we have made, we may refer to the great dearth of public examples. We do not know a single work devoted exclusively to the design and treatment of halls and staircases; the very few descriptions, drawings, and plans published which are at our service being more incidental than of value to the architect. The Italians and French have been most prolific in inventiveness, and lavish in their architectural arrangements and decoration; with them the hall and staircase have been the *pièce de résistance* of the interior, the greatest and highest art has been displayed in the hall of entrance; notwithstanding which the best foreign examples are not so well known as they deserve to be. The palatial staircase is now to be seen only in our public buildings, our municipal edifices, picture galleries, public assembly-rooms, and club-houses; there are few modern private examples equal

in importance to the staircase seen at Bridge-water House. The types of plan we have given possess a monumental character, and entail certain dimensions to produce any

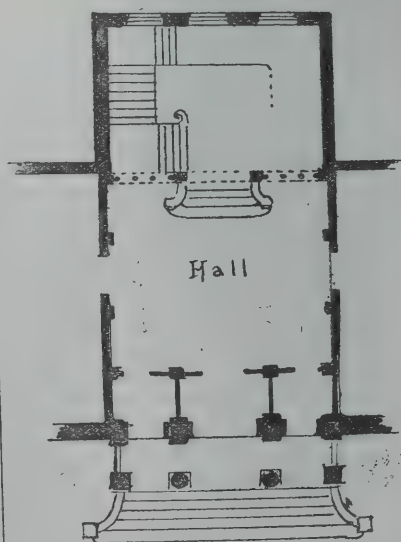
Plan 15.



Plan 16



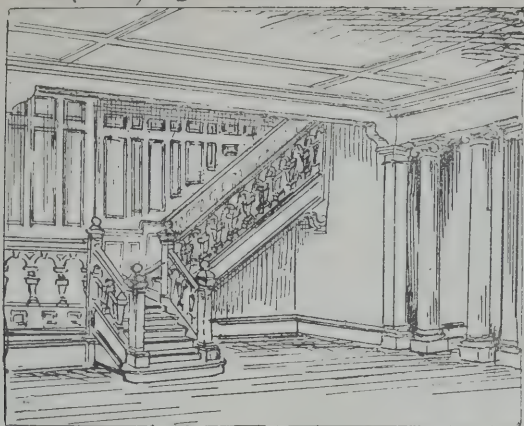
Plan 17



effect; the flights should be at least from 10ft. in width, making a hall of 18ft. to 20ft. wide necessary. A massive and monumental character is given by the unpie-



Sketch 18

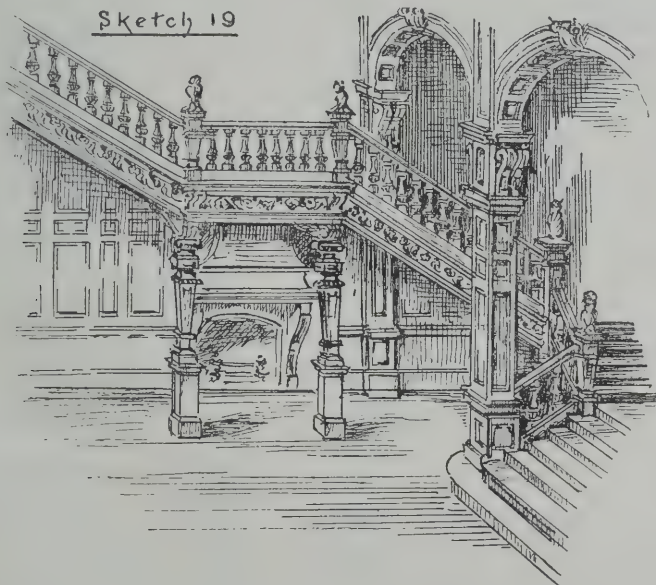


balustrade of stone or marble, with relief pilasters and panels. The colonnette or open baluster also contributes to architectural effect, and probably the least satisfactory stair balustrading is that of iron. We constantly meet with fine staircases spoilt by ornamental cast-iron balusters, some of which are carried on brackets let into the ends of the steps, a device which seems to suggest that the original stairs were not wide enough. The square newel of square shape lends itself to the architecture far better than any other form. If the centre flight arrangement be adopted with a screen of columns, the latter can be made to take the place of the newels, the pedestal surbase moulding being made to mitre with the handrail. We shall point out

level of the vestibule. Side screens of colonnettes divide the two, and impart a semi-private character to the staircase. A more solid appearance could be obtained by dwarf wing walls on either side.

We may now refer to one or two architectural arrangements of the double flight shown in diagram C in our last article. The most obvious of these is to divide the width of staircase into three parts by a screen of two columns, which can be placed as newels to the ascending flights. Another plan is to divide the width into five intercolumns, one embracing the side flight on either side, another embracing the side well spaces, and the centre intercolumn embracing the centre flight leading to the landing, the four columns being placed at equal distances apart. Or, instead of a colonnade, an arcade of five arches can be substituted. A very effective

Sketch 19



one or two modes of accomplishing this in a future article.

To refer to our illustrations. Plan 16 represents a residence in which the entrance and hall are emphasised externally though central to the main reception rooms, which enter out of it. The staircase is retired in the rear; by the side of it a door opens into a verandah which communicates with a bayed conservatory, forming a handsome addition to the end of the drawing-room. Opposite the hall is a library or reception-room. The hall is compactly planned. On one side of the entrance vestibule is a small bay or recess, suitable for a seat or for plants.

The next arrangement (plan 17) shows a type of central hall suitable for a public institution, in which the staircase is placed on the same axis, lighted from the rear. A short flight of steps leads from the hall to the staircase hall, which is raised to that extent above the

plan, suitable for the entrance to a public building in which there is a basement, is to have a centre descending stair of some width to the lower level, separated by dwarf walls or balustrades from the vestibule floor. From this level, further in the rear, the principal stairs ascend by a central short flight to a landing, from which the wing flights of stairs branch off to the upper floor, as we have indicated in plan B. A mode of screening the return or wing flights is to form an arch on each side, also inclosing the sides or spandrel spaces by wing walls; in other words, the wing stairs are inclosed or rest on walls each side, a plan we shall show as we proceed. On the upper floor level or landing the angles of this inclosure carry columns, which become newels to finish the flights, a plan that has been well carried out at the Spa Buildings, Scarborough, of which Mr. Thomas Verity is the architect. Here a handsome flight, broken

by a landing, ascends from the vestibule level with solid stone balustrades on each side; these stop about half-way up against pilasters, from which spring side arches, which screen the wing flights; above this the first flight has solid spandrel side walls, which finish below the raking soffits of the upper flights. On the first-floor level two columns terminate the raking balustrades of these flights, the balustrade capping or hand-rail encircling the shafts of the columns. Between these the open well-hole is inclosed by a curved balustrade.

A galleried hall for a private residence may be made a picturesque feature (see plan 15). We illustrate a pleasing arrangement, in which the hall is separated from the staircase, and rendered a valuable reception-room, with a fireplace on one side, and a bayed recess or conservatory on the other, approached under the gallery, which can be made to communicate with the drawing-room by a verandah or short corridor.

Our last two sketches indicate two of the methods we have already considered. The first is a private staircase in a hall, the lower flight being made short, and placed in the centre of the hall—a plan which we have given in a previous article. The last sketch shows a design for a larger staircase on the plan we have lately discussed, a short central flight to a quarter landing, a few more steps to corner landings, and thence by long wing flights to the upper floor. The latter are broken by landings, one of which is shown. The design illustrates that of Mercers' Hall, Cheapside, a building rebuilt from the late Edward I'Anson's designs.

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XII.

By HENRY LOVEGROVE, F.S.I., Surveyor.

I WAS obliged to condense what are usually called in surveyor's offices the "small trades," in order to avoid continuing the subject of the detached house over too many weeks, and also delaying the introduction of a new and interesting subject.

I will just give the summary to complete the bills, and as for the better explanation of the work, I divided the Joiner into several sections, I am obliged to give those sections under their respective headings in the summary.

### SUMMARY—DETACHED HOUSE.

	£	s.	d.
Preliminary.....	.....	.....	.....
Drainage .....	.....	.....	.....
Excavator .....	.....	.....	.....
Bricklayer .....	.....	.....	.....
Mason .....	.....	.....	.....
Tiler .....	.....	.....	.....
Carpenter .....	.....	.....	.....
Joiner and Ironmonger (generally).....	.....	.....	.....
Staircase leading into garden .....	.....	.....	.....
Conservatory .....	.....	.....	.....
Staircases .....	.....	.....	.....
Founder and Smith .....	.....	.....	.....
Plasterer .....	.....	.....	.....
Plumber .....	.....	.....	.....
Glazier .....	.....	.....	.....
Painter .....	.....	.....	.....

The summary generally includes the surveyor's charges and the cost of lithography, with any other expenses incurred in connection with the work. The total is carried to the form of tender, which should be sent out with the quantities.

The next subject for our consideration is a design for an

### ISOLATION HOSPITAL,

suitable for erection in a country town, or in the more remote suburbs of a large city.

It is not necessary to repeat the well-known arguments in favour of such buildings, as many of us know the difficulty in safely isolating a patient suffering from an infectious disease when the house has a fair number of rooms; but the difficulty is well-nigh insuperable when the available space for the whole family is three rooms, or even one room, as is frequently the case in London, and probably other large cities.

During the present year some new regula-



tions have been issued by the Local Government Board, and the design has been prepared to incorporate them, and at the same time to show how such a building may be architecturally treated without any considerable addition to the cost.

The two wings are exactly alike, as would be the back and front elevations, with the exception of the gable over the w.c.

Two wards, one for two patients and the other for three, are furnished for each sex, with a nurse's room between the wards. The w.c. and sink are detached adjoining the verandah, and in a convenient position under the verandah the wheeled bath would find a resting-place when not in use.

The walls would be lofty and well lighted, all angles rounded, the floor of wood-block paving with a dado of glazed tiles.

The grates proposed to be used would be those invented by Dr. Pridgen Teale. In some positions it might be found advisable to inclose the verandah with glazed sashes.

The kitchen, laundry, scullery, &c., are not shown, as it is assumed that those necessary adjuncts would form a small administrative block either specially erected, or a cottage adapted to the purpose.

The staircase between the smaller wards gives access to five rooms on the upper floor, which it is suggested would be useful as sleeping apartments for nurses or servants, and as private wards for special cases or persons desiring, by payment, to secure privacy equal to home, with all the benefits of hospital treatment.

The specification describes the materials intended to be used throughout the building, the elevation of good red bricks relieved by the deeper and more purple-red of red terracotta, the roof of cherry-tinted Broseley tiles, and all external joinery painted white.

I take this opportunity of acknowledging the many kind and appreciative letters received, showing that the papers have been carefully followed from week to week by the readers of the BUILDING NEWS. Nor must I forget the able assistance of Mr. W. Heelis and Mr. A. F. Wrightson, my lieutenants, who have undertaken to assist me in some part of the work when my numerous engagements press too heavily.

A suggestion has been made that some of the bills should be priced, and I hope to carry this out in one or two of the subjects treated, although as prices change so frequently, those now in use may be quite obsolete in a few years.

**SPECIFICATION of the works to be performed in the erection of an Isolation Hospital in a country town. Maurice B. Adams, F.R.I.B.A., architect.**

#### PRELIMINARY.

- 1. Notices.**—Give notice to the Surveyor of the Local Board of Health, and deposit tracings if required.
- 2. Water.**—Provide water for the use of the works.
- 3. Insurance.**—Insure the building when roofed in for the full amount of the contract, and deposit the policy with the architect.
- 4. Rubbish.**—Remove rubbish and superfluous earth from time to time, and leave the building and site clear.
- 5. Attendance.**—Attend upon, cut away for, and make good after all trades in all trades.

#### EXCAVATOR.

- 6. Digging.**—The surface mould over the entire area of the building to be removed to a depth of 6in. Dig out the earth for the concrete foundations to the widths and depths shown upon the drawings.
- 7. Concrete.**—The concrete for foundations to be composed of 1 part of well-burnt ground stone lime and 6 parts of gravel, or 3 parts of broken flint and 3 parts of gravel, no stone to be larger than will pass a 3in. ring.
- 8. Drains.**—The drains to be formed as shown on the drainage plan, with salt-glazed stoneware socket-jointed pipes, and Stanford's patent joints. Form the inspection chambers with one-brick walls on concrete, rendered on the inside in cement, with a half-pipe channel bedded in cement, and dish up at sides in cement. Patent manhole flap and frame, set in 9 by 6 tooled York stone curb. The

syphons to the chambers to have cleaning arms with caps.

#### BRICKLAYER.

- 9. Mortar.**—The mortar to be composed of one part of stone lime and three parts of clean pit or river sand.
- 10. Cement.**—The cement to be Portland, from an approved manufacturer.
- 11. Bricks.**—The bricks throughout to be hard, square, well-burnt local bricks.
- 12. Facings.**—All external facings to be of the best quality red bricks, finished with a neatly-ruled weather joint.
- 13. Bond.**—The walls are to be laid in Flemish bond, and all the joints are to be well-flushed up; no bats to be used except for bond or closers.
- 14. Damp-course.**—All walls are to have a course of stoneware damp-proof course, at such levels as may be directed.
- 15. Moulded Work.**—The chimney caps and any other ornamental brickwork to be cut, rubbed, and gauged in the best manner.
- 16. Arches.**—All external arches to be gauged with a moulded brick hood moulding as shown. All internal arches to be roughly axed, and relieving arches are to be the full length of the lintels.
- 17. Trimmers.**—Turn half-brick trimmer arches in cement to the hearths of private wards and bedrooms.
- 18. Chimney Lintels.**—Instead of the usual chimney bars and arches, all the fireplace openings are to have lintels 6in. by 4½in., composed of coke breeze and Portland cement, in the proportion of one to six; two iron bars in same.
- 19. Stoves.**—Properly set the whole of the stoves, which are to be of the kind known as Dr. Teale's (see Smith).
- 20. Bedding.**—Properly bed all plates, templates, &c.; also door and window frames, and point up after.
- 21. Generally.**—Examine all brickwork at completion. Stop holes after plumber; also putlog holes, and leave the whole of the brickwork clean and perfect.

#### DIMENSIONS—EXCAVATOR.

The lengths of the walls must be taken on waste, thus the external walls amount to 377ft. 4in.

	ft. in.		
	377 4		
	3 4	1257 9	Dig, cart, and concrete for foundations for external walls.
	1 0		
4	14 0		
	2 6	140 0	Add cross walls.
	1 0		
2	18 0		
	2 6	90 0	Add stairs.
	1 0		
6	9 2		
	1 2	64 2	Add chimney breasts.
	1 0		
2	43 6		
	2 6	304 6	Add verandah.
	1 0		
2	28 0		
	2 6	140 0	Dig, cart, and concrete walls of w.c.
	1 0		
2	5 6		
	2 6	27 6	Add.
	1 0		
	377 4		
	3 4	2830 0	Dig and cart, a part filled in and rammed.
	2 3		
4	14 0		
	2 6	315 0	Add.
	2 3		
2	18 0		
	2 6	202 6	Add.
	2 3		
6	9 2		
	1 2	144 4	Add.
	2 3		
	43 6		
	2 6	244 8	Add.
	2 3		
2	28 0		
	2 6	315 0	Add.
	2 3		
2	5 6		
	2 6	61 10	Add.
	2 3		
2	25 0		
	43 0	2150 0	Dig and cart to surface.
	1 0		
2	46 0		
	34 0	3128 0	Add.
	1 0		
2	13 0		
	3 3	84 6	Add.
	1 0		
2	18 0		
	38 0	1296 0	Dry brick rubbish, filled, well rammed and levelled.
	1 0		

2	ft. in.		
	16 0		
	14 0	448 0	Add.
	1 0		

2	24 0		
	18 0	864 0	Add.
	1 0		

	3 0		
	18 0	54 0	Add.
	1 0		

2	44 0		
	7 3	638 0	Add.
	1 0		

2	3 0		
	5 0	30 0	Add.
	1 0		

2	3 6		
	5 0	35 0	Add.
	1 0		

6	5 6		
	1 2	38 6	Deduct.
	1 0		

2	18 0		
	36 0	1296 0	
	16 0		

2	14 0	448 0	
2	24 0		
	18 0	864 0	

6	5 10		
	1 2	40 10	Deduct.
	1 2	42 0	

2	44 3		
	7 3	641 8	

2	3 0		
	2 0	6 0	Add in doorway.
	15 0	150 0	Add.

2	3 6		
	5 6	38 6	Add.
	3 0		

2	5 6		
	3 0	33 0	Add.
	3 0	12 0	

4	3 6		
	3 9	7 0	
	3 9	15 0	

2	3 6		
	5 6	33 0	
	8 6		

2	1 3		
	1 2	21 3	Deduct and deduct.
	1 2	14 0	CC. and R. as last.

2	46 0		
	92 0	15 by 8 rubbed York step, bedded in concrete, including all joints in cement.	

2	4		
	43 9	87 6	Fair ends to do.
	2		9 by 7 do. do. back jointed.

			Perforations through 7in. stone for R.W.P.
--	--	--	--

#### BRICKLAYER—FOOTINGS.

377 4			
9	283 0	2½ B. footings to external walls.	

4	14 0		
	6	28 0	1½ B. add cross walls.
	18 0		

2	6	18 0	Add to stairs.
	7 0		
	9	31 6	1½ B. chimney breast.

2	43 6		
	6	43 6	1½ B. footings to verandah walls
	28 0		

2	6	28 0	
	5 6		Add w.c., &c.
	6	5 6	

#### WALLS ABOVE FOOTINGS.

ft. in.			
377 4			
16 0	6037 4	1½ B. external walls.	

4	14 0		
	16 0	896 0	1 B. add cross walls.
	18 0		

3	16 0	576 0	Add stairs.
	5 10		
	16 0	560 0	1½ B. chimney breast.

2	43 6		
	2 3	195 9	1 B. walls to verandah.
	6 3		

4	2 0	50 0	1 B. wall above step.
	5 0		
	1 9	35 0	Half-brick wall in cement.

2	28 0		
	13 3	742 0	1 B. walls to w.c.
	3 0		

2 2 ½	3 0	18 0	1 B. spandrel.
	3 0		
	7 0		

2	5 0	42 0	Add back wall.
	8 0		
	2 0	16 0	

½	8 9		
	5 0	21 11	Add gables.
	3 0		

2	3 0		
	9 6	28 6	
	3 0		

4	1 6		
	2 6	15 0	1 B. pin at end of wall.
	1 6		

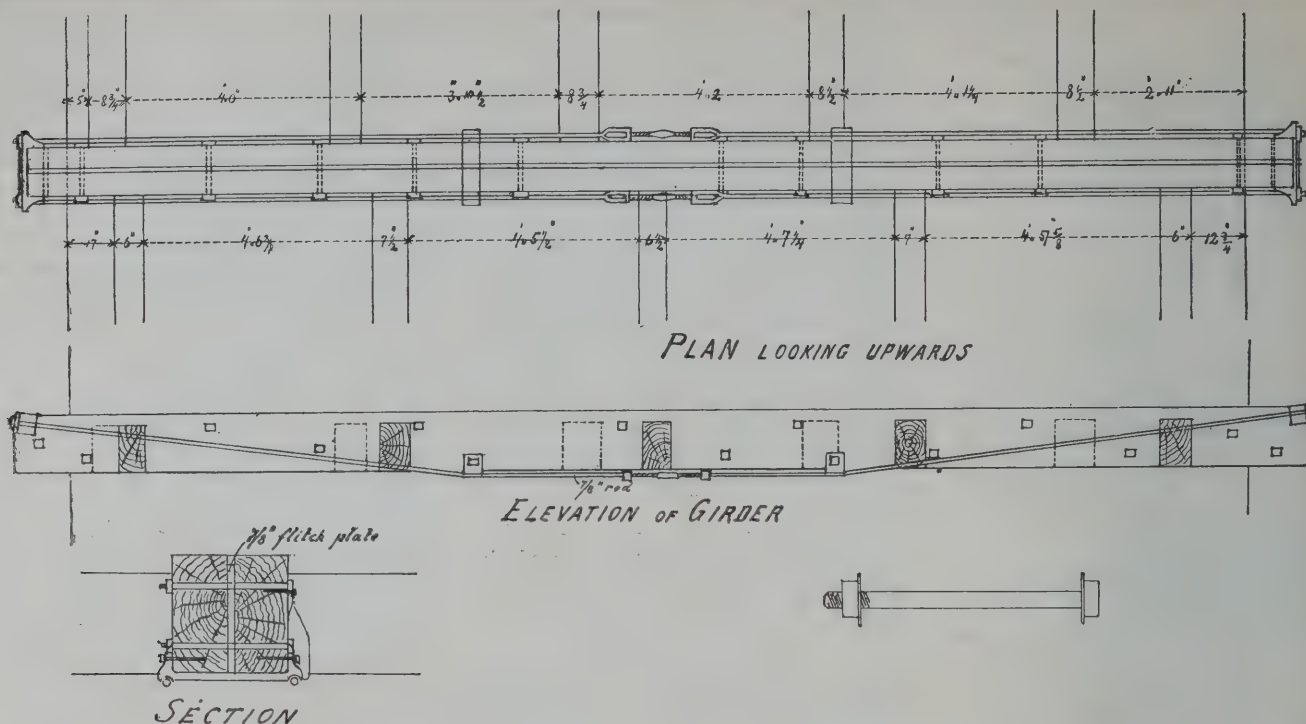
6	2 6	22 6	1 B. in ct. pieces or bases to p.
	1 6		
	2 0	6 0	1 B. in ct. do. against wall.



SURVEYORS' INSTITUTION.

\* The Design and Construction of Masonry Dams, giving the Method employed in determining the Profile of the Quaker Bridge Dam. By EDWARD WEGMANN, C.E., M.Am.Soc.C.E. London: Trübner and Co.





case, arrived at certain equations by which the section of that structure has been calculated. These he details in the work before us, which is rendered of more general value by the particulars he gives of the construction of some of the chief masonry dams, not only in America, but in Spain, France, Algiers, and other countries. The mathematical principles of the subject involved in the investigation of theoretical profiles are fully discussed, and the work is illustrated by numerous plates showing the profiles of dams that have been constructed, besides various theoretical and practical profiles. As the author says, masonry dams were little known till the 16th century. The French were the first who investigated the subject on mathematical principles. De Sazilly's memoir is one of the earliest and best. This writer showed that no masonry dam has been known to fail by sliding; therefore he thinks that the profile of a dam should be determined solely with reference to a certain safe limit of pressure on the masonry. The stepped profile is recommended by this author as being an easy method of obtaining a profile of equal resistance. Delocre was another authority who has given formulæ for calculating profiles, and both these types are given. Professor Rankine improved the French method of investigation: he adopted simpler formulæ, a lower limit of vertical pressure for the front face than the back, and he also made the front pressures diminish as the batter increases. The effect of this is to reduce the batter of the back face as given by the French types, and he chose logarithmic curves for both the inner and outer faces. He further pointed out that the stability of a dam against overturning depends on the limits of the line of pressure, which ought to be confined to the middle third of the profile. We have no space here to dwell on the mathematical part of the question, which the author treats in a masterly manner; but the practical profiles he bases upon theoretical types appear to fulfil the necessary conditions. It is certain that the maxima pressures will depend on the inclination of the resultant of the forces of gravity and water pressure. The three conditions laid down by the author are that (1) the lines of pressure must be within the centre third of the profile, whether the reservoir be full or empty; (2) the maxima pressures in the masonry or on the foundations must never exceed certain fixed limits; (3) the friction between the dam and its foundation, or between any two parts divided by a horizontal plane, must be sufficient to prevent sliding. In the third practical profile given (Plate XIX.) these conditions have been worked out. The front face has a curved outline and four straight lines for the back face, the top width 18·74ft., height 200ft. The author shows the stability of this profile graphically in Plate XX.,

and the forms adopted by Sazilly, Delocre, Prof. Rankine, Krautz, and others. The comparison of types shown in the frontispiece is interesting as exhibiting some coincidences with Rankine's profile. Profiles are also given of several well-known dams, including the Vyrnwy, the Geelong, Tytam, Sodoin, Bridgeport, and the proposed Quaker Bridge dam, which last will surpass in height all others, and will form part of the vast storage reservoir for the City of New York. Mr. Wegmann's work is full of valuable information, and will become a textbook on the subject.

#### A TOUGH JOB AT LONGLEAT.

THE accompanying drawing illustrates the method adopted for removing a broken girder from a double-framed floor in dining-room at Longleat, and inserting a new one from the underside without disturbing the floor above—the room over being occupied at the time—the process was as follows:—After taking down the ceiling a prop was securely placed under each "binder" to support the floor; the old broken girder was then cut out, and the tenons cut off one set of binders only, leaving the ends of binders about a quarter of an inch out of square. The new girder was then prepared as illustrated, with wrought-iron flitch bolted between the two timbers, one half being  $\frac{1}{4}$ in. thicker at lower edge, forming a kind of wedge to insure a tight fit to ends of binders. After being fitted complete, and trussed with tension rods on the ground, it was taken apart, and the iron flitch screwed to the mortised half-timber with strong countersunk screws. This half, with flitch-plate attached, was then inserted in its place, carrying the binders on that side. The other wedge-formed half timber was then inserted very lightly, and the two bolted together. The binders from which the tenons had been cut were then secured to the new girder by strong stirrup-irons and dry oak wedges. (See section.) The tension rods were then added thus: As the walls were not allowed to be pierced through at either end, the ends and heel plates were necessarily inserted by hand, and the rods tightened by means of union-screws in the centre, thus completing the girder. The props were then removed and the new ceiling put up.

W. BUCKENHAM.

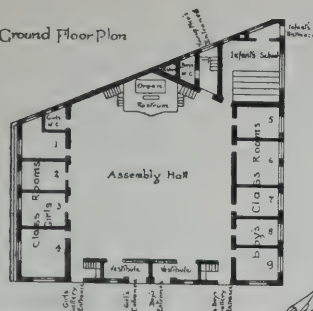
#### BOOKS RECEIVED.

Notes on the Thirteenth-Century Lady-chapel of Bristol Cathedral, by THOMAS S. POPE, architect, are instructive to the architect and antiquary. Mr. Pope summarises in the little brochure he has published the conclusion of a detailed examination of Bristol Cathedral, made

by himself and other members of the club he represents, for the purpose of settling the question as to the possibility of the 13th-century Lady-chapel having been originally detached from the north aisle of the Norman church. From a photograph taken by the late Mr. G. E. Street of the west end of the south aisle of choir, before the new nave was built, it is evident that the aisles of the old Norman nave were much narrower than those of the present 14th-century choir. The Norman aisles appear to have been vaulted, and to have had wide triforium galleries over, open to the roof timbers of the original church. Other indications in the masonry on the south side of chapel, and the reduction of the lancet windows in height when the 14th-century recesses were pierced, show a reconstruction. The groove visible from the roof of the Lady-chapel upon the Norman buttress at the north-east angle of north transept, and also upon the base of Early English pinnacle of the Elder Lady-chapel, measures an angle of 58 degrees or 60 degrees with lead, a very usual pitch of 13th-century roofs. Another discovery was that one of the arches, the most eastern on the south side, was used as a piscina, the drain still remaining. From these and other facts Mr. Pope assumes that the chapel, as originally built, had a high-pitched roof, and was isolated from the north wall of the church. Thornton Abbey, also a house of Austin Canons, has a similar plan. The author thinks it probable that the east window of Bristol Cathedral was designed and worked by the same man who did the east window of Carlisle, also an Austin house, and possessing the finest traceried window in the world, which was erected shortly after 1292. Coloured decorations are found upon the arcades of chapel. Mr. Pope remarks on the differences of masonry on the buttresses to the Elder Lady-chapel and other parts, and throws out the suggestion that the Lady-chapel was first built with an open timber roof, that early in the 14th century it was vaulted in stone, that the east window was put in about the same time. The high pitched roof was probably removed in the 15th century and the present Perpendicular window and its fine glass were then inserted. — *Designing Wrought and Cast Iron Structures*, Part V. Notes, Calculations, and Working Drawing for a Wrought-Iron Roof Truss and a Cast-Iron Column, by HENRY ADAMS, M.Inst.C.E., M.Inst.M.E., M.S.A., &c., Professor of Engineering at the City of London College (London 60, Queen Victoria-street, E.C.). Mr. Adams in continuation of his useful handbooks, has published another part, which completes the present series. The subject treated is a wrought iron truss for roof of 45ft. span, with angle iron purlins, fir rafters, slate battens, and Countess slates. This problem is worked out



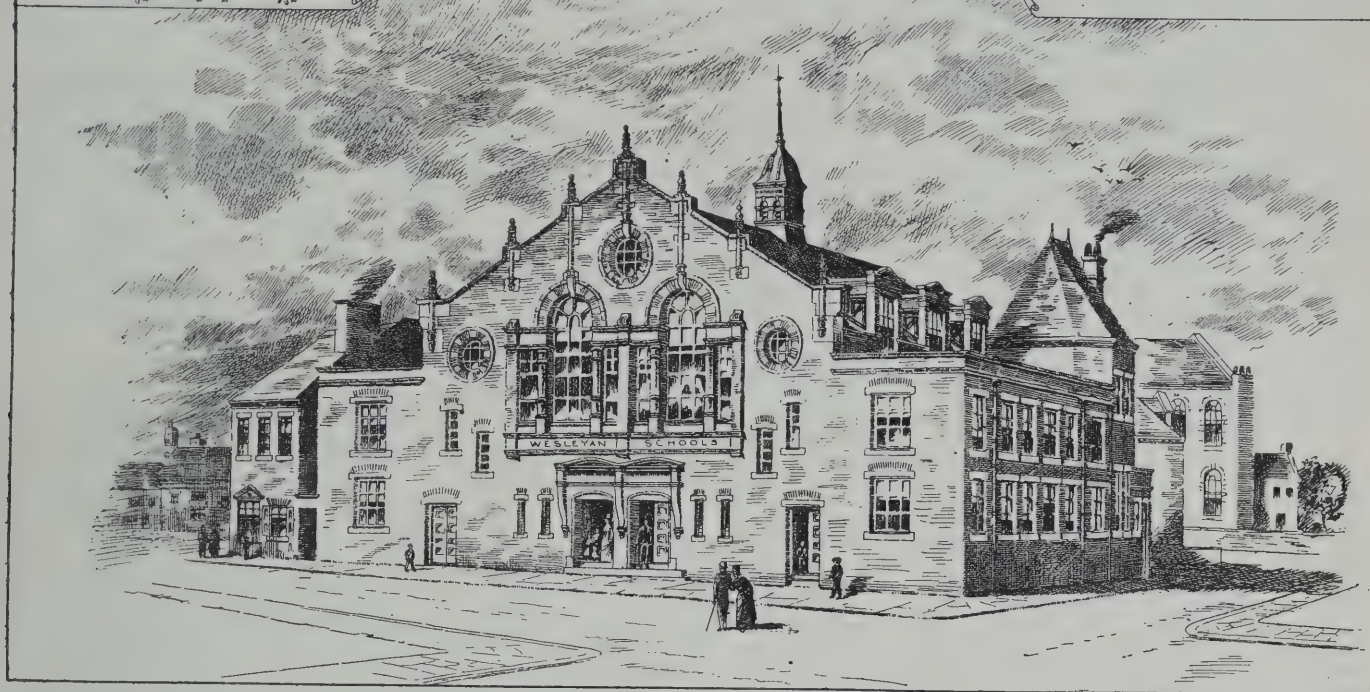
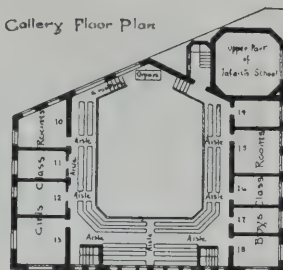
Ground Floor Plan



## Hunslet Wesleyan Sunday Schools

T. Butler Wilson, Architect  
12 Boar Parade, Leeds &  
Central Chambers, Harrogate.

Gallery Floor Plan



logically from considerations of span and load. A stress diagram is shown for each type of truss suitable for roof from 40ft. to 50ft. span. Each rafter is divided into four bays, the loading being distributed as follows:  $\frac{1}{16}, \frac{1}{8}, \frac{1}{8}, \frac{1}{16}$  = total load or unity. The method of finding the stresses is shown in detail, with the mode of summing up the tension and compression members. After deciding upon the type of truss, the load of covering, &c., the distance apart of trusses is decided. The total load on each truss is found, allowing 60lb. per foot superficial as a vertical load, from which the stresses on each member can be determined. In the latter operation, the student or draughtsman will find the sectional area of every detail calculated, showing him by practical example the process to follow in designing his truss. The other subject given is the design of a cast-iron hollow column 15ft. high, to carry a dead load of 30 tons. Professor Adams's series, now completed, form a valuable guide to the architect and draughtsman of iron construction.—*The Pocket Technical Guide Measurer and Estimator for Builders and Surveyors*, by A. C. BEATON, fourth edition (London: Crosby Lockwood and Co.), has been carefully revised and brought up to date. The sections on measuring artificer's work, specifications, making roads, and the prices of work will be found to contain in a small compass all that is necessary for ordinary work.—A new *Catalogue* has just been issued by Bell's Asbestos Company; it is well got up, and printed in two colours, while the numerous illustrations show how long a list can be made of manufactures in which asbestos is the principal ingredient. They include pure spun yarn for engine packing and filtering cloth, mixed yarns, flooring and wall felt, sheeting and tape, mill-board, cloth and cordage, cement, paint, and putty and lubricants. The company are evidently keeping pace with the requirements of engineers and electricians. We note that one-third of the total quantity of asbestos used in the world is derived from the company's estates.—*Ventilation of Cotton Mills* (Manchester: Blackley and Bland). Some notes on

this subject by Mr. J. D Sutcliffe are published in pamphlet form, with a useful introduction on mechanical ventilation by Mr. H. H. Osborn, Government inspector of factories, in which the developed application of special volume fans as extractors, supplemented by vertical inlet tubes, is recommended as a solution of the practical difficulties experienced in securing movement of air in large workshops.

## WESLEYAN SCHOOLS, HUNSLET, LEEDS.

THESE schools, which are built of "Woolley's" bricks with Morley stone dressings, occupy a somewhat irregular site, giving an assembly hall 61ft. by 50ft., capable of seating over 1,000 scholars. Galleries are placed on three sides, supported by iron brackets, the absence of pillars giving the floor a very open and roomy appearance. At one end is a rostrum with organ. There are eighteen classrooms, an infants' school, and a young men's room. For facility of communication there are staircases connecting each gallery with the rostrum. Careful provision has been made for the safety of the children. There are two entrances from the street to the assembly-hall floor, and the gallery staircases communicate also directly with the street by means of two separate doors. There is also a fifth entrance behind the rostrum. The assembly hall is well lighted large windows, 28ft. in breadth, opposite the rostrum, and by means of dormer windows over the class-rooms on each side: their roofs being flat and leaded to admit of this arrangement.

These buildings were opened in December, 1887, and have been built at a cost of £2,000, from the designs and under the superintendence of Mr. Butler Wilson, architect, of Leeds and Harrogate.

## SKETCHES OF OLD WOODWORK, YPRES.

THIS decayed old Belgian town is now but a relic of its former prosperity and importance, but the city still contains many an evidence of the wealth and good taste of its

builders. The vast Town House, or Les Halles, as it is called, ranks among the wonders of the world; indeed, the late Mr. Geo. Edmund Street considered it for entirety of effect "inconceivably grand, leaving behind it in point of general character even the Ducal Palace at Venice." Immediately to the rear of Les Halles stands the cathedral, with its fine western tower, built in 1330, and remarkable for the triple buttresses at the angles. The pointed arch and the best window tracery are used in the Town Hall throughout, and yet no one would confuse it for a church or religious house, or even part of the cathedral buildings with which it groups so effectively. There are many old houses in the town, generally of the 16th century, with stepped gables and four-centred window heads with carved tympana, and here and there through the streets may be noted bits of good timber building and rich woodwork. Not a few of such specimens have of late years been pulled down, and the sheet of details printed herewith furnishes examples of this kind drawn from photographs by J. Van Ysendyck for his exhaustive work on Flemish and Belgian architecture and art called "Documents Classes de l'Art dans Les Pays Bas du et au XVIII. Siècle," published at Brussels.

## CHIPS.

The foundation-stone of the outside harbour of Bilbao, at the entrance to the river Vervion, was laid on Friday. Breakwaters, 4,800ft. and 2,400ft. in length respectively, will be carried out on either side of the mouth of the river, the span between the piles being 2,100ft. wide. The works are from the designs of the Spanish engraver, Churrua, but are based on those proposed fifteen years ago by Sir John Coode and Mr. Vignoles.

The foundation stone of a Roman Catholic church now being erected in Jermyn-street, Sleaford, was laid on Friday. Mr. Maxey, of Sleaford, is the contractor.

The renovation of the Eleanor Cross at Waltham was completed last week. Mr. C. E. Ponting, of Marlborough, was the architect, and the statuary has been executed by Mr. Harry Hems, of Exeter.



## WAYSIDE NOTES.

THE Corporation of London having entered into an agreement with Mr. W. Webster for the construction of the southern approach to the Tower Bridge, at an outlay of £38,383, and the City seal having been duly affixed to the contract and duplicate, the inhabitants of Poplar, seeing the rapid progress that is being made with an undertaking that will largely benefit the neighbouring districts, have been roused into action in the matter of the proposed construction of the Thames (Blackwall) Tunnel for vehicular traffic. A public meeting was held last Monday at Poplar Town Hall, and the importance of the construction of this tunnel was urged by many speakers, it being pointed out that, with a dense population continually pouring eastwards, further communication was necessary, and the best site for the purpose was midway between the upper and lower docks. This tunnel, which was to have been an M.B.W. undertaking, has, I believe, been talked of for some time, and unlike the construction of more bridges east of London Bridge, is a perfectly unobjectionable scheme. I do not know of any difficulty in the formation of the tunnel, though on Monday last it was hinted that those who would have the supervision of the work have expressed doubts on the subject, and the meeting was, in consequence, somewhat indignant. There was not much said about the poetical side of the engineering work involved. Quite the contrary. If one engineer cannot cope with the difficulties, another must, it was said; and there the matter ended.

M. Eiffel seems to have some difficulty in managing his men, even if he finds none in the construction of his abortion. No sooner does the monster rear its head a few extra metres above the fair city of Paris than the artisans strike for more wages—a sort of performance that now seems to be periodically enacted. M. Eiffel having found it necessary to offer to treat the men to a lunch when the tower had only reached the second platform, one is led to wonder what will be the inducement held out to these gentlemen when it attains to within a few metres of its full height. A champagne supper, possibly.

Southend is to have a new pier, a contract having been entered into between the Local Board and Messrs. Arrol, of Glasgow, for its construction for £43,484 11s. 2d.—a very considerable sum, one is led to reflect, especially as the superstructure will be extra, and an additional expense will be incurred by a tramway, taken to the pierhead, and proposed to be worked by electricity. Then, in addition, the engineer's commission—unless there is an error in the report I read—is to be six per cent. I always understood that a C.E. was content with the £5 per centum which the humble architect receives. Evidently the "ship" of the Southend Local Board has just come home, for, in addition to the outlays mentioned above, it has commenced to make an expensive roadway between Southend and the adjoining village of Prittlewell, with a view of uniting the two places; and this wedding ring, and the completion of the purchase of the foreshore from the lord of the manor, will involve the Board in the outlay of many thousands of pounds.

Health and prosperity to the newly incorporated town of Chelmsford! Let us hope that the mayor, councillors, and burgesses will quickly decide to have a town hall worthy of the occasion, and thus give a stimulus to the municipal branch of the architectural business, which has been rather slack of late.

The case of Hartshorne v. Linseed Oil has attracted considerable attention. The editor of the *Athenæum*, however, appears to have become heartily sick of the subject. The two columns or so of correspondence which appeared in that journal last week is to wind up the discussion on "this wretched paint." Yet these two letters are about as diverse in opinion and conclusion as can well be imagined. One is from Dr. Furnivall, and the other from Professor Roger Smith. Dr. Furnivall writes of the panelling in Haddon Hall hall and chapel that "the oak is just like a dried and miserable-looking old calf book, which is appealing to you

for a dressing of vaseline." Says Professor Roger Smith of the same panelling: "The prevailing tone of colour is now that wonderful silvery grey which old oak sometimes assumes." Who shall decide, when a doctor and a professor disagree? Many will doubtless be surprised to learn that Professor Roger Smith defends "this wretched paint," and says: "I fully concur with those of your correspondents who say that the woodwork does not appear as if it had been intended to remain unpainted." Alas! for all our vaunted 19th-century enlightenment on first principles of art and architecture. An architect by profession, and a professor of architecture, writes the *Athenæum*, and upholds the cause of sham-graining, practically stating that it is his conviction that a beautiful piece of oak panelling was intended by its constructors to be bedaubed with paint!

I was glad to see your correspondent "An Assistant Surveyor's" remarks on compulsory examination for Local Sanitary Authorities. There is no doubt that much that he says is perfectly warranted by fact. Many can testify to similar experiences.

If theatre entrances and exits are so constructed that, in case of a panic, people may rush out, it follows that, at times, inconvenience may result from persons rushing in. At the New Court Theatre, the approaches to the pit are of such amplitude in proportion to the seating area, that on the opening night a large body of persons pushed through without paying, and, I believe, a scene of considerable disorder resulted. It appears, from a letter of Mr. Emden to the *Standard* of the 26th, "that the real difficulty in the pit exit is that the pit is small." In other words, the pit was constructed too small for the doors. This is an excellent fault, however, and there would be no inconvenience if some sort of barrier could be put up to prevent a rush in. The Board of Works will not allow any barrier, and very wisely, if it be fixed and immovable. But I should have thought that a barrier could be designed that would withstand any crush from without, while the slightest push would open it from within—something of an open V-shape on plan. The M.B.W. should allow a barrier of this description to be put up, as theatre owners will not be disposed to construct doorways of more width than they are absolutely obliged to, if the public can rush in without paying, and, as I happened to overhear one of the unpaying pittites remark, "find sixpence on the floor!" Mr. Emden well alludes to crowds "of this description." In designing a public building in this country one has to take into account the unmannerly conduct of the English mob. In an entrance we have to consider that unrestrained selfishness which will crush women and children in its endeavour to get first; and in an exit we must allow for that cowardice and demoralisation which is doubtless ultimately connected with this brutality. The theatrical theatre door should be constructed like that to a rat-trap, only the reverse way about—so that no one could rush in, but all could rush out. A V-shaped barrier would be just such a trap as the English mob requires.

It is said that we never know what we can do till we try; and, with equal truth, it might be said that we can never find out the true value of any article till it is put up to public auction. On Tuesday last there was sold by public auction a plot of ground at Folkestone, which the Government had proposed to sell for a Jubilee hospital site, and several questions were asked about it in Parliament last session. The price proposed by the Government was £700. At Tuesday's sale it realised £3,425! The Pavilion business sinks into insignificance beside this.

The Society of Engineers must have had an exceedingly interesting visit when, on Tuesday last, they proceeded to inspect the locomotive, carriage, and waggon works of the London and South-Western Railway at Nine Elms. The original works, designed by the late Mr. Joseph Beattie, have been considerably increased by the present superintendent, Mr. William Adams, and important additions have been made within the last two years that enable the company to

manufacture their own engines at the rate of one a week if required. The new machinery is said to be well worth inspection, especially the milling machine for cylinders, the emery wheels for grinding the piston rods, and the hydraulic machinery for pressing and moulding the boiler sides and other plate work. I can only wonder why the company do not turn out more engines of their own make. They appear to lack confidence, as I believe all the express engines are supplied to them by private firms. The newest engines have, it is said, a patent "vortex blast pipe," by means of which the consumption of fuel per mile run has been reduced from 30lb. to 26½lb. This does not seem much, but it is stated that the annual saving effected by its use is £34,000. The works of the South-Western Company now cover 45 acres of ground.

I hasten to correct any false impression that I may have made by stating that the outline of the dome-shaped roof at the Farnborough Mausoleum is like that of the roof over the lantern tower at St. Pierre, Coutances. Happening to alight on a photograph of the Norman building that I purchased at Coutances, I find that the two structures in question are totally different in outline. The roof over the lantern tower of St. Pierre is a pyramidal erection, so it is about as much like the cupola at the Mausoleum as is a Dutchman's hat. GOTH.

## THREE COUNTRY HOUSES.

THESE three country houses are from designs by Mr. Chas. W. Dempsey, architect, 161, Palace Chambers, Westminster.

Hepworth House,\* at Hepworth, some few miles north-east of Bury St. Edmund's, the property and country residence of Mr. Thos. Tindal Methold.

Thorne Court, at Shimpling, near Bury St. Edmund's, the property and country residence of Mr. Fred. J. Methold, F.S.A.

Meldreth Court, at Meldreth, near Royston, Cambs, the property and country residence of Mr. J. G. Mortlock.

All three houses are enlargements and reconstructions of existing smaller houses, and have been planned in each case to include a large central hall, which, as in the case of most old country houses, is used not merely as a thoroughfare, but as one of the sitting-rooms of the house. In the design (both exterior and interior) the aim has been to get a homely and picturesque effect with simple means; the style adopted being the Old English vernacular, and the materials used are red bricks and tiles of the district, with some admixture of half-timber and plaster work. Hepworth House, of which a portion, including the library and the projection to the left, has not yet been carried out, was built by Mr. A. Adams, Stanton, Ixworth. The builder of Thorne Court is Mr. J. Ince, Shimpling. In the case of Meldreth Court, although the plans are approved, the contract is not yet signed.

On Tuesday week a meeting was held at the Assembly Hall, Holywell, when the claims of a new scheme for supplying with water the large district embraced in Holywell, Greenfield, and Bagillt were advocated. A company has been formed, with a capital of £20,000, to carry out the scheme, and assistance has been promised by the chief landlords. The source of the supply is Milwr, about a mile and a half above Holywell, and the water, after passing through filtering beds, will be stored in two large reservoirs. The engineer is Mr. H. Taylor, of Chester, who also acted in a similar capacity to the Hawarden Waterworks Company.

On Tuesday week dedication services were held at Zion Chapel, Frome, to celebrate the completion of the new front and other improvements, which will involve an expenditure of £1,500. The new front is Lombardic in style, and includes a central vestibule and two side porches, with new entrances to the galleries. The plans were supplied by Mr. Joseph Chapman, of Frome, and the principal building contract was taken by Mr. Chislett, of the same town.

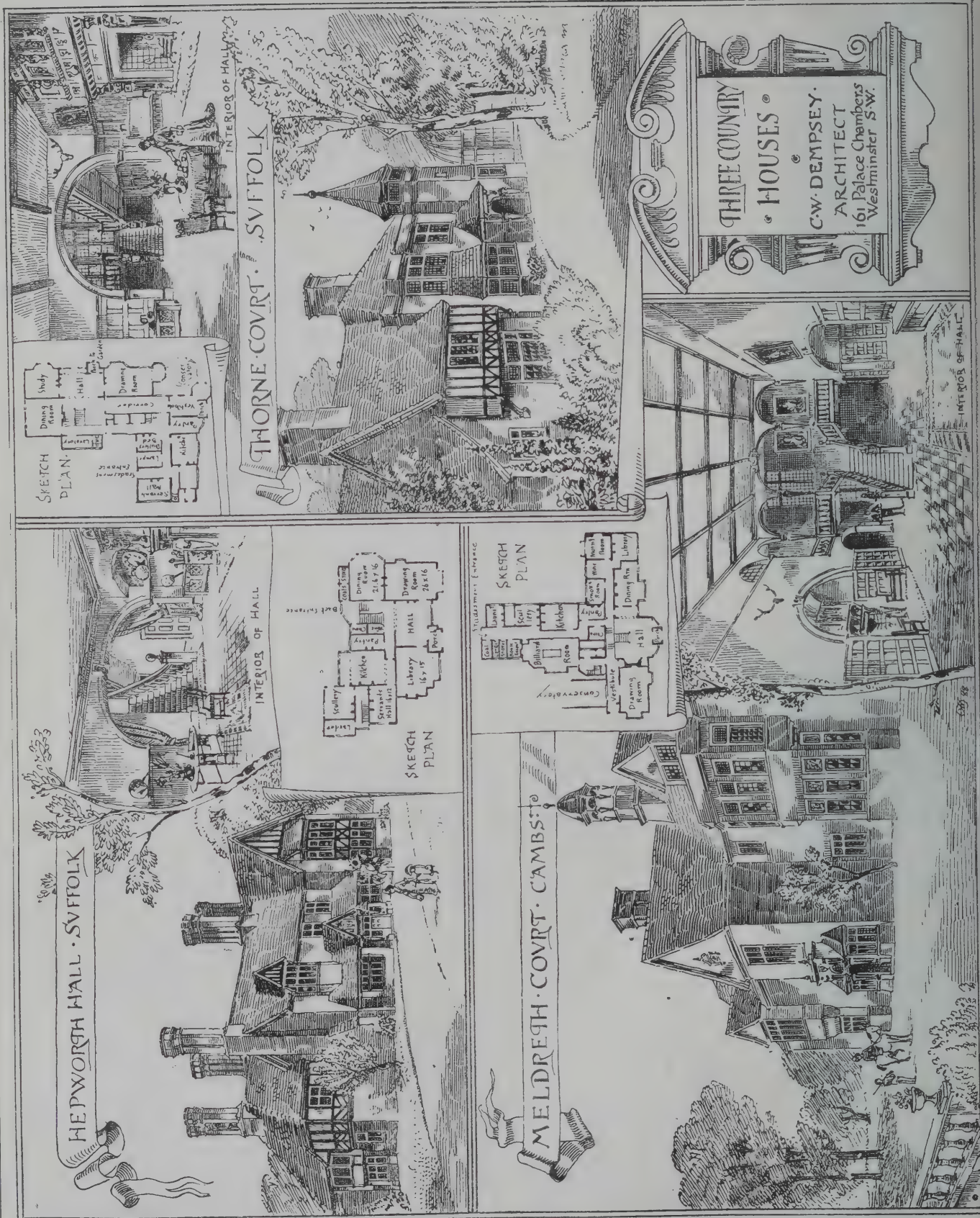
The organ in Southill parish-church, Birmingham, which has been rebuilt at a cost of over £500, by Messrs. Hill and Son, of London, was re-opened on Saturday.

\* Not Hall, as described in error on the illustration.





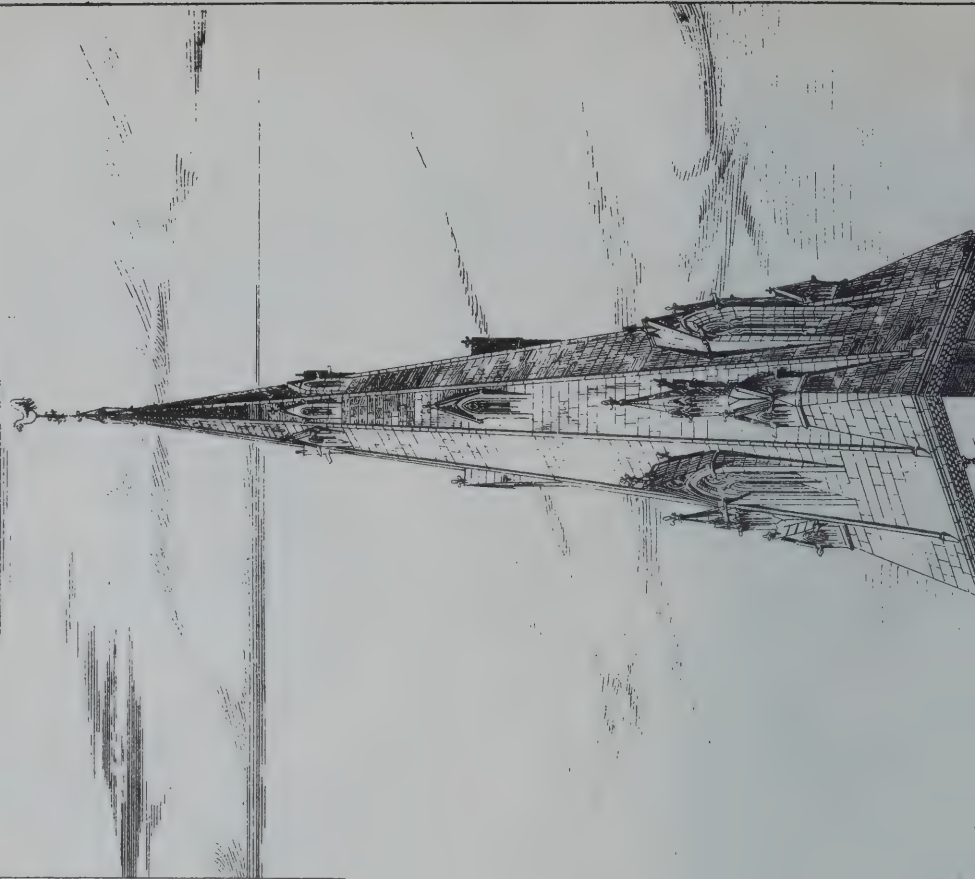
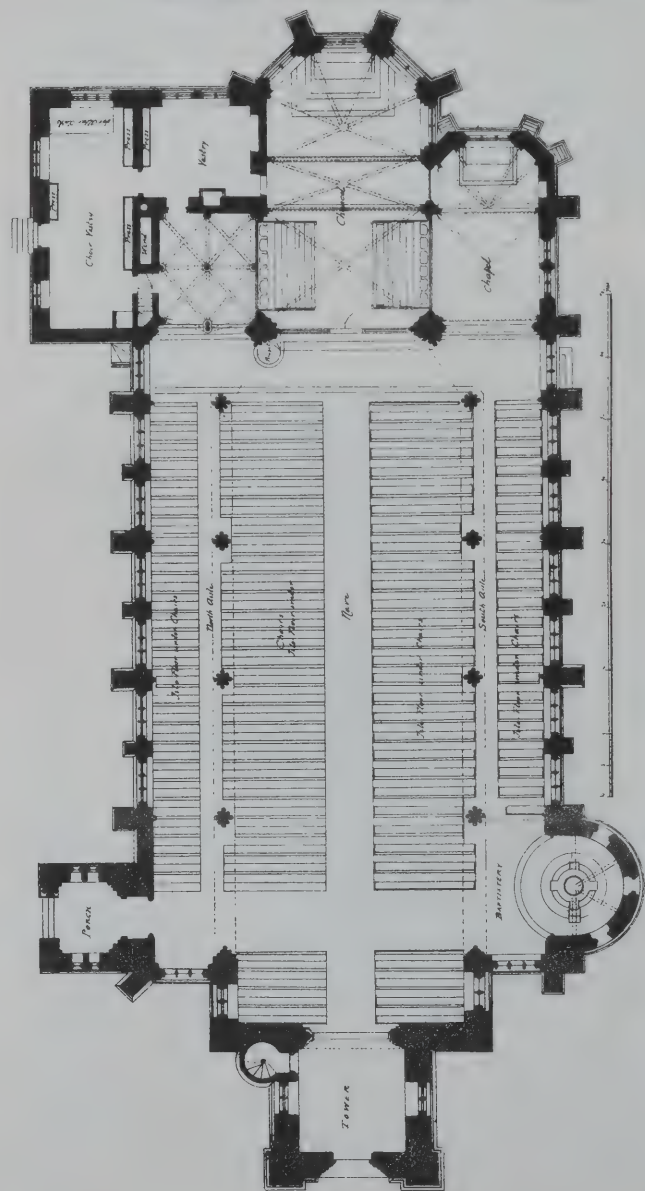




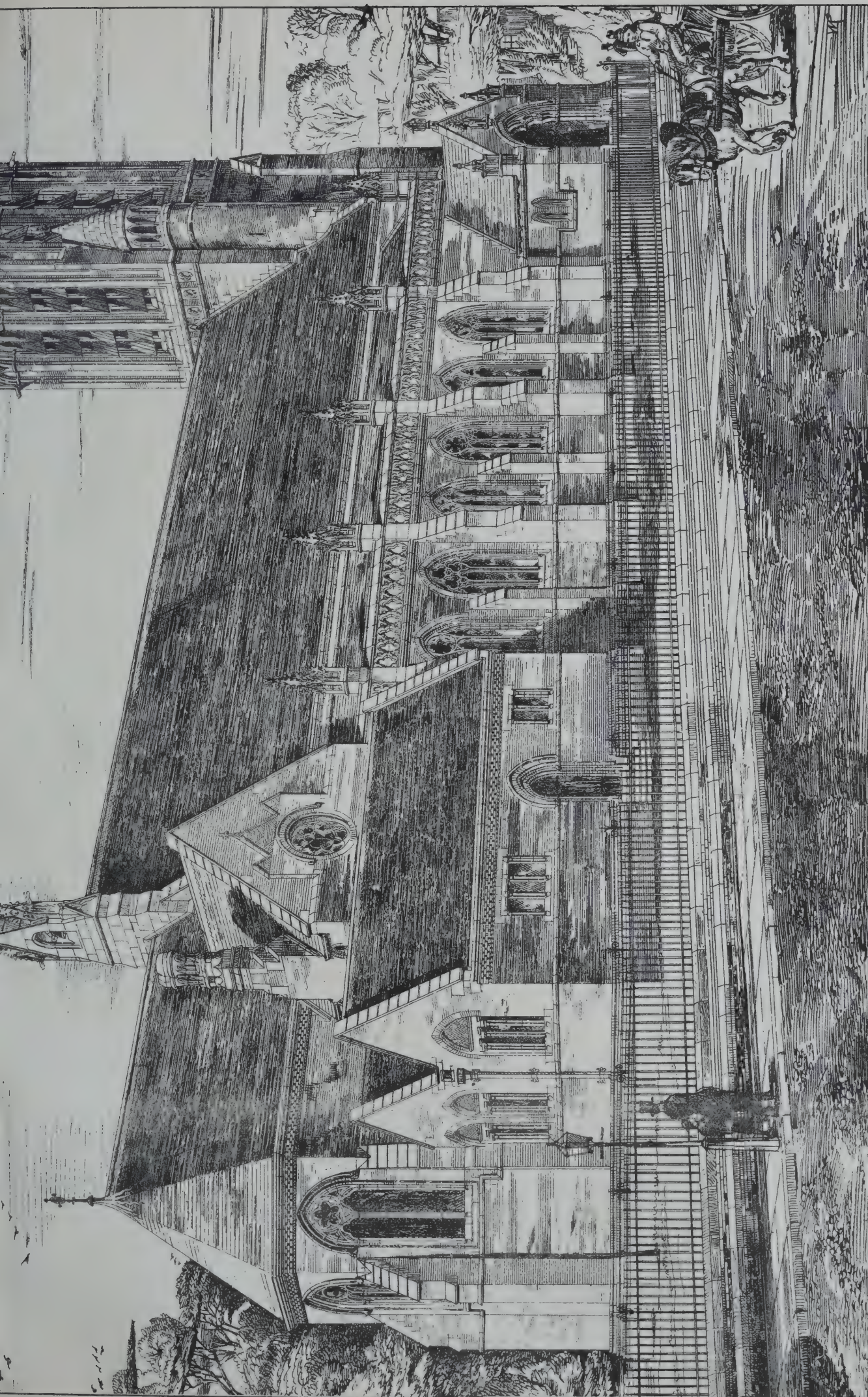












✠ Church of St. John the Divine Kennington ✠

*George Edmund Street R.A.*

Photo Lithographed & Printed by James Akerman 6, Queen Square W.C.

VIEW SHOWING TOWER & SPIRE NOW IN COURSE OF ERECTION · ARTHUR · E · STREET M.A. ARCHITECT

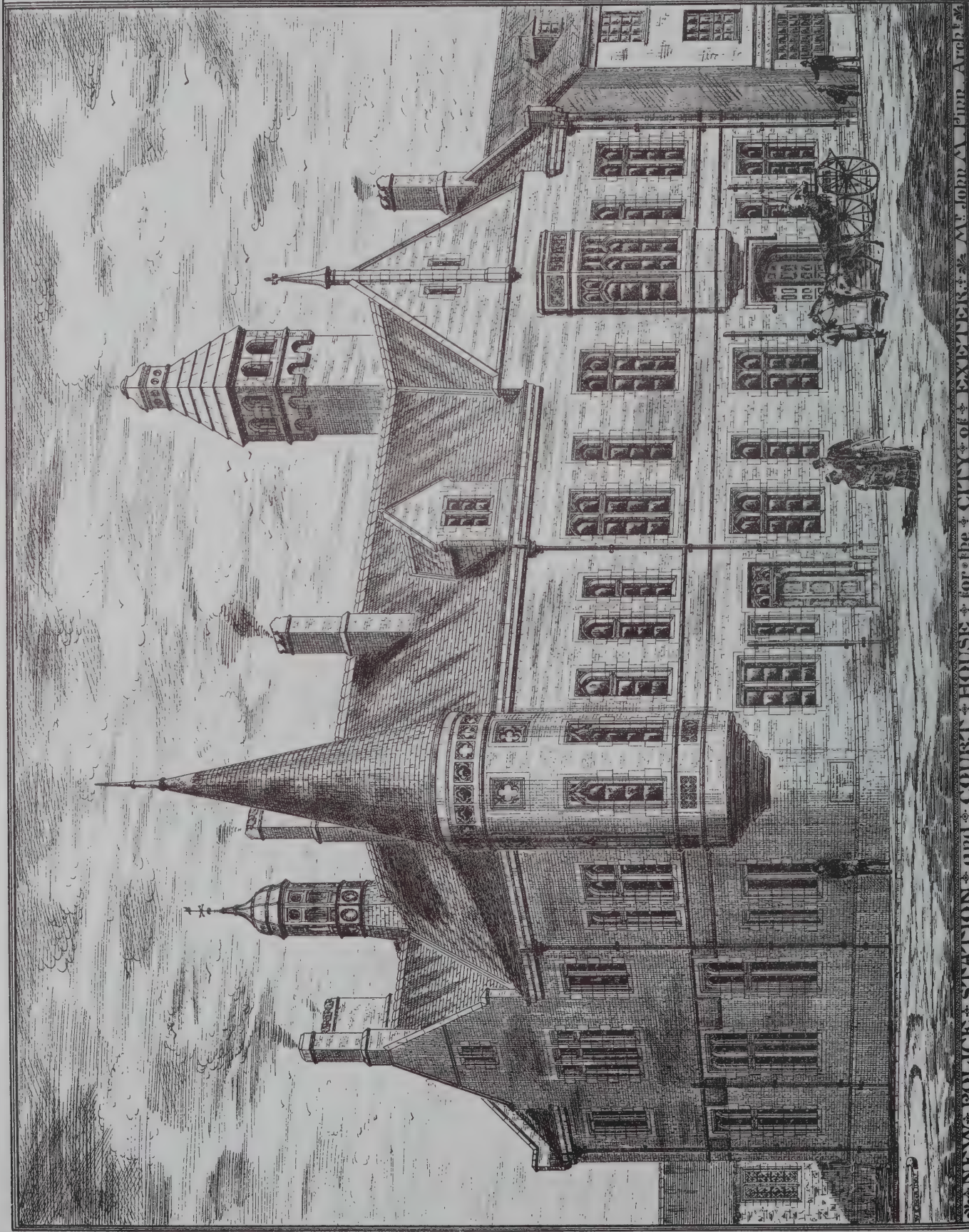




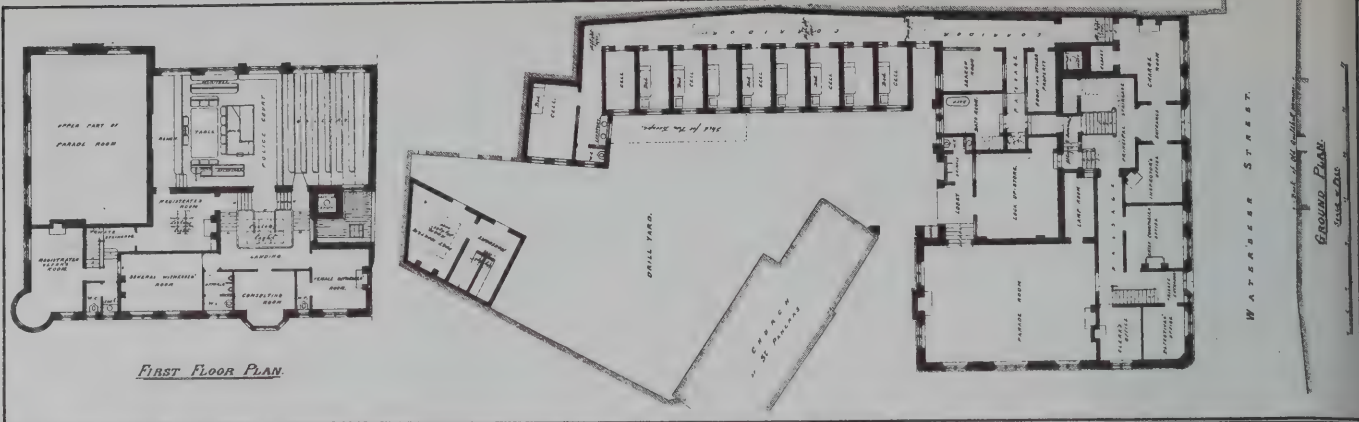








NEW POLICE STATION AND COURTHOUSE FOR THE CITY OF EXETER. BY MR. JOHN A. SMITH, ARCHT.



FIRST FLOOR PLAN

WATERGATE STREET

Scale of Feet  
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Feet



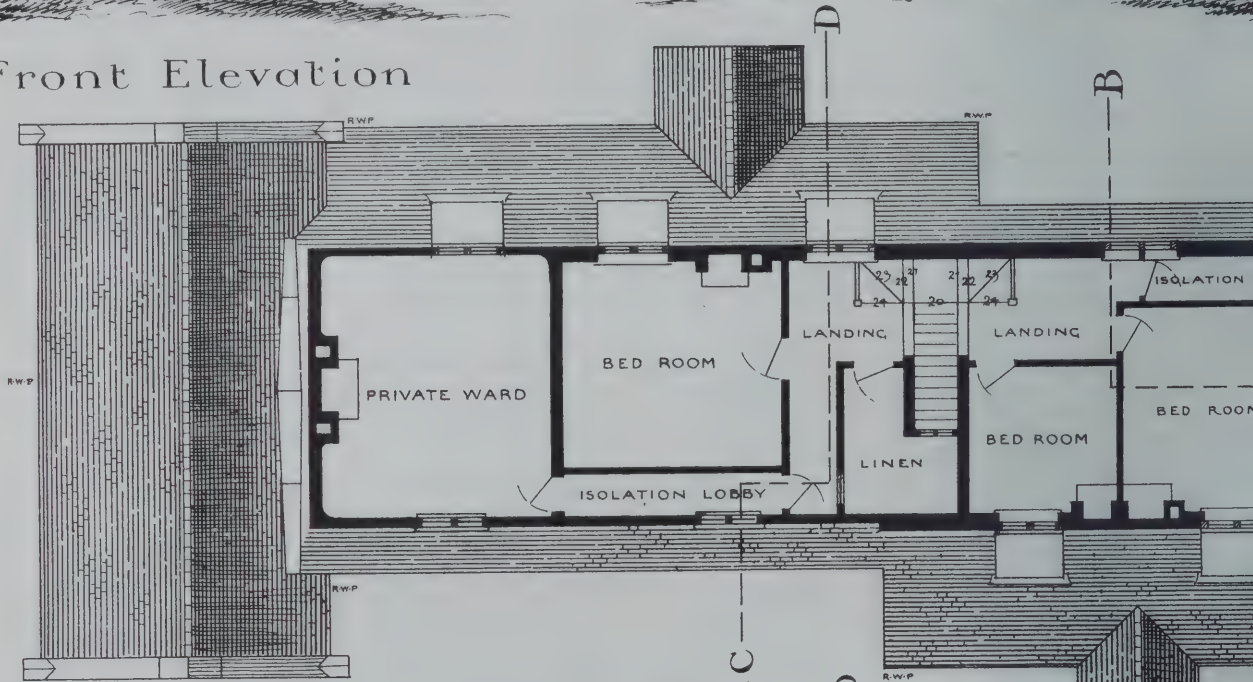




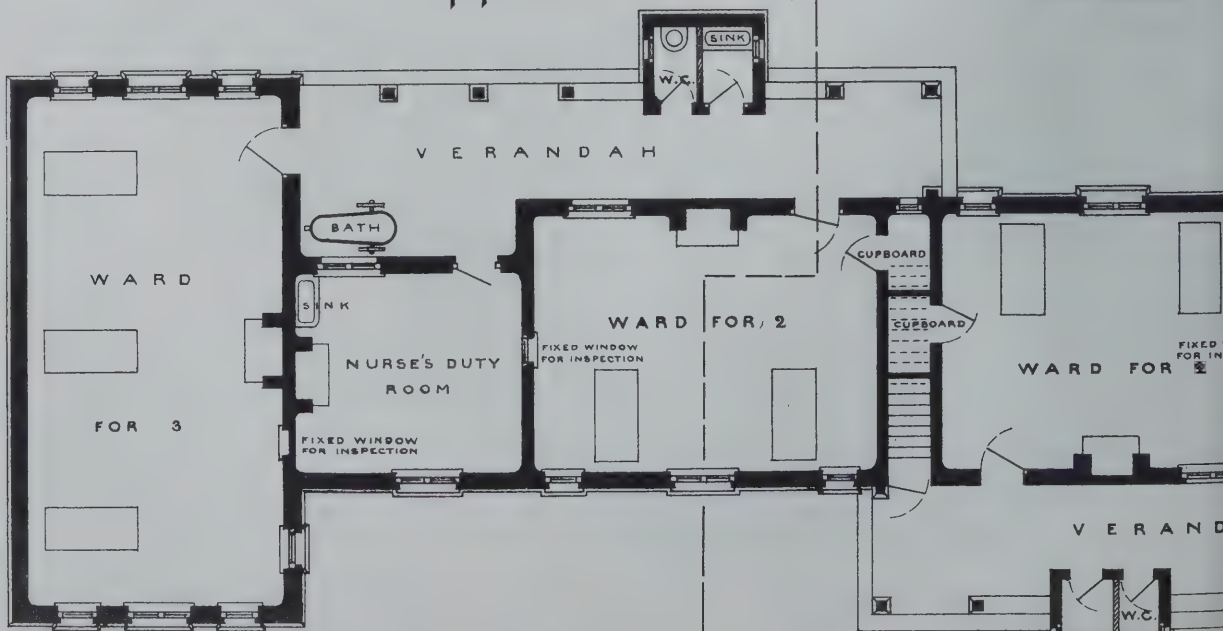
THE PLAN OF THIS BUILDING  
INCORPORATES THE LOCAL  
GOVERNMENT BOARD'S LATEST  
OFFICIAL MEMORANDUM  
1888



Front Elevation



Upper Plan



Ground Plan

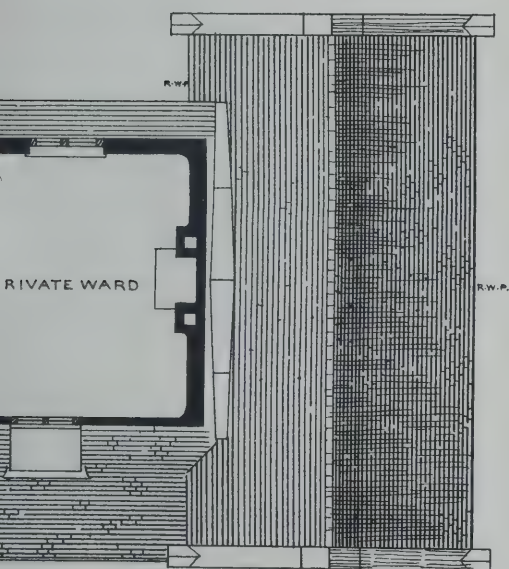


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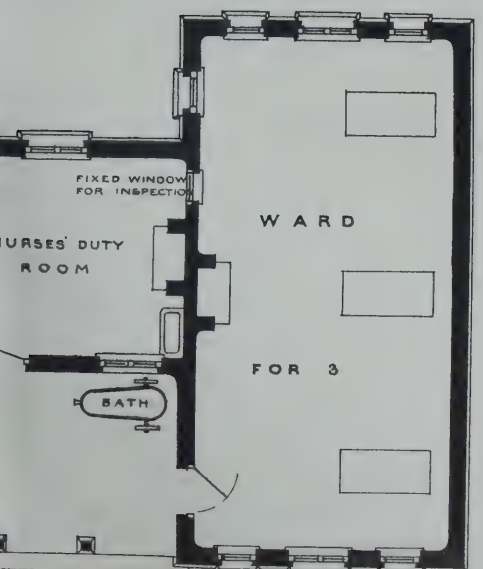
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Ends



Section A.B.  
Section C.D.



SCALE OF FEET









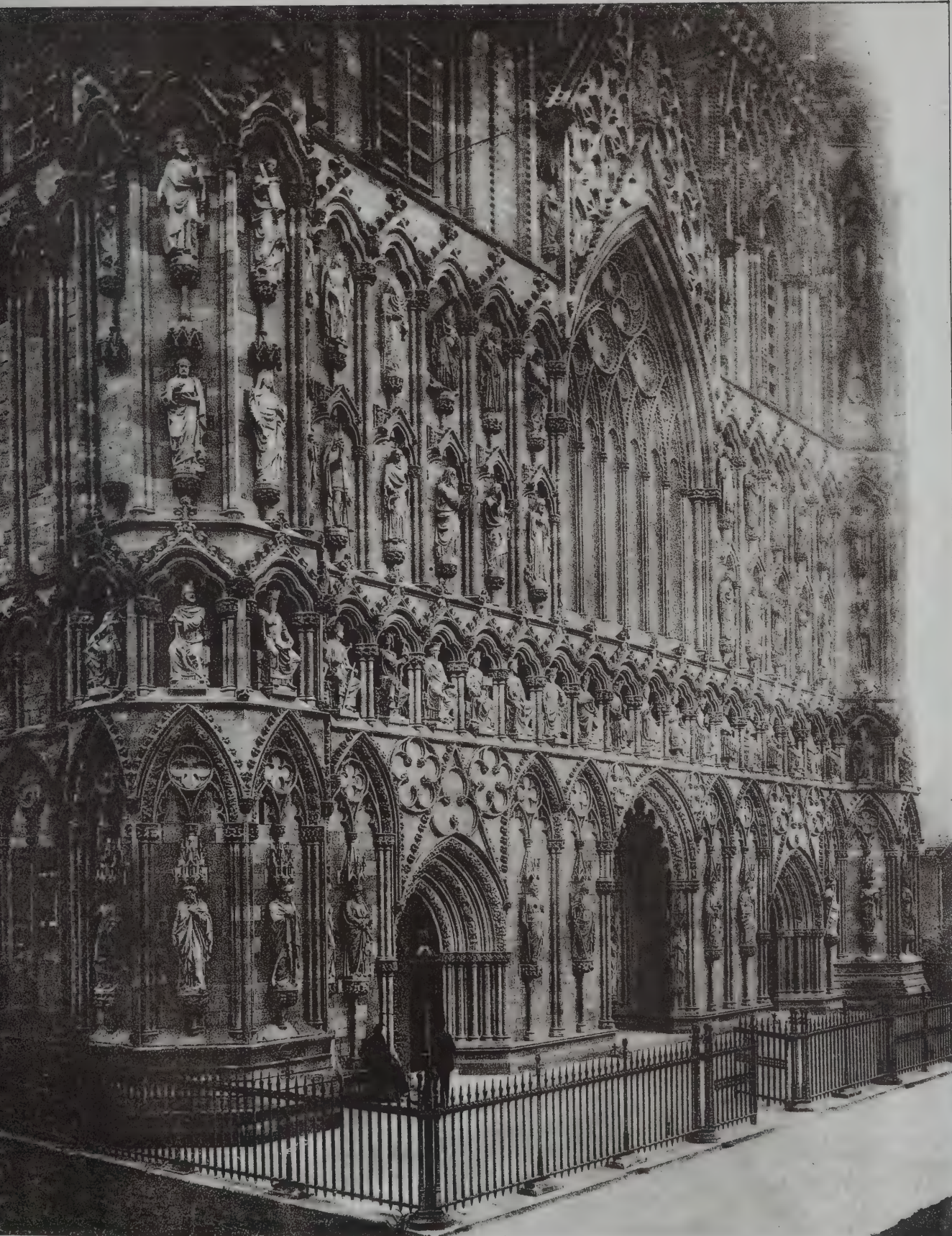






p.28, 1888.

LICHFIELD · CATHEDRAL · WEST · FRONT PHOTOGRAPHED · BY · J·L·ROBINSON A·R·H·A



"PHOTO-TINT" by James Akerman. 6. Queen Square. London. W.C.





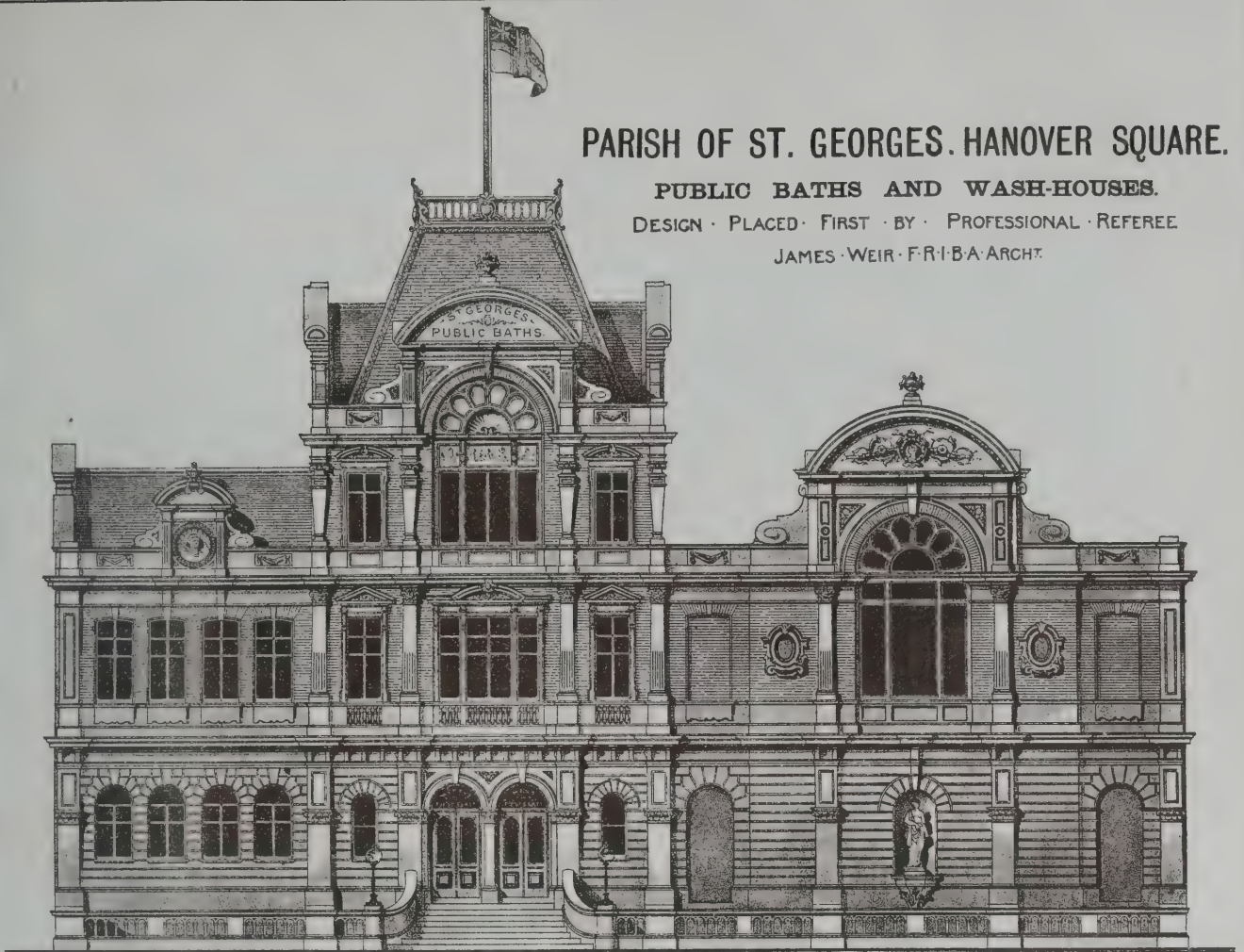


# PARISH OF ST. GEORGES. HANOVER SQUARE.

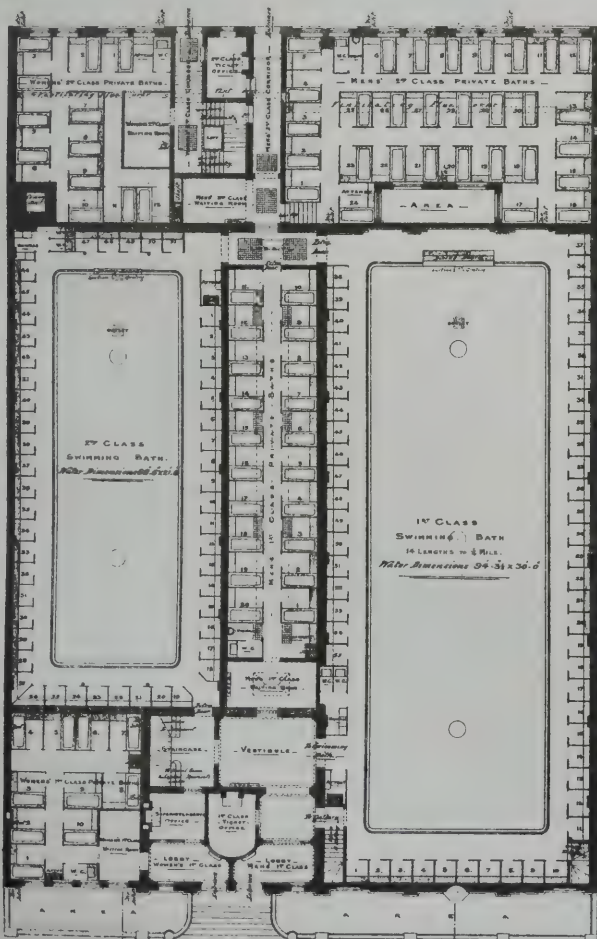
PUBLIC BATHS AND WASH-HOUSES.

DESIGN PLACED FIRST BY PROFESSIONAL REFEREE

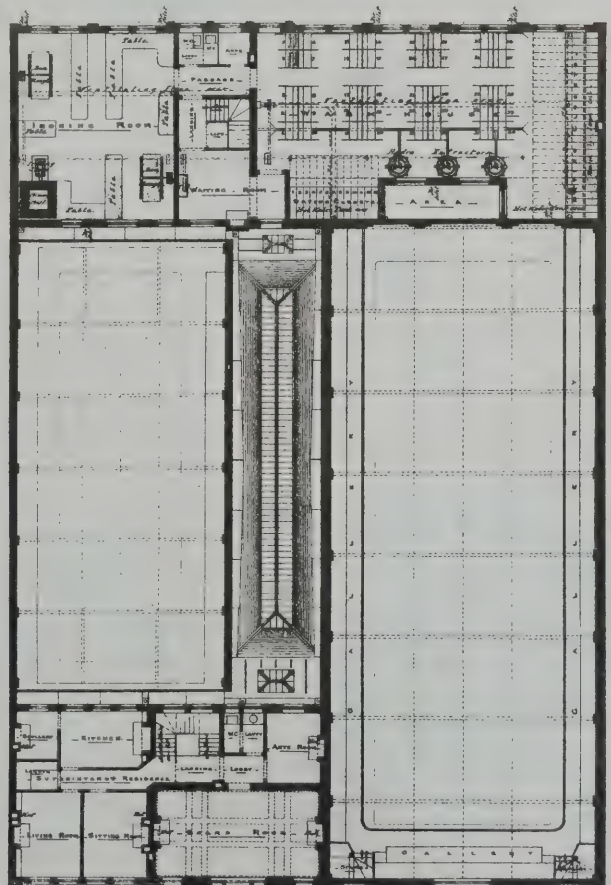
JAMES WEIR F.R.I.B.A. ARCHT.



ELEVATION TO BUCKINGHAM PALACE ROAD



GROUND PLAN



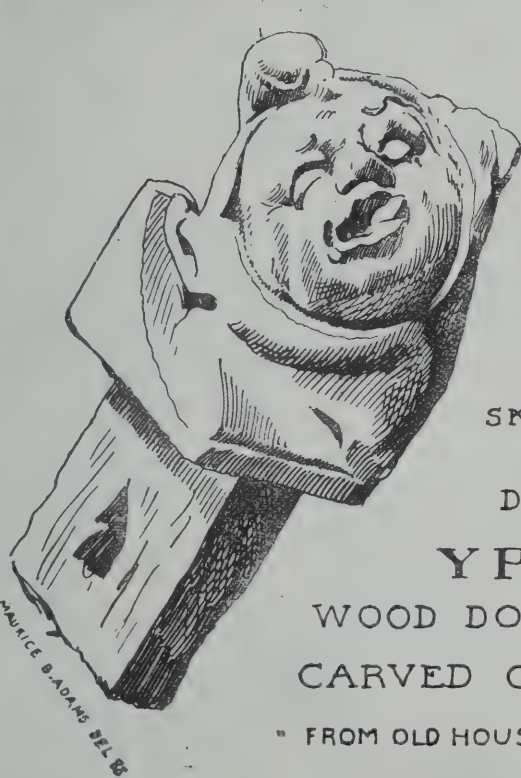
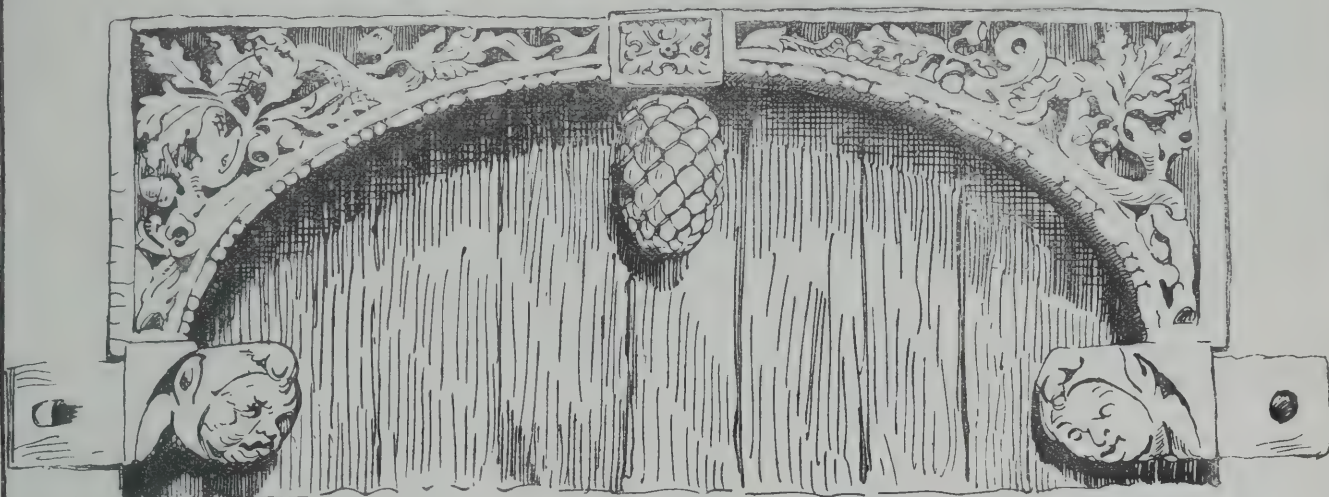
FIRST FLOOR PLAN







GENERAL ELEVATION OF ARCH &c



SKETCHES  
OF  
DETAILS

YPRES.

WOOD DOORHEADS &  
CARVED GROTESQUES

" FROM OLD HOUSE NOW PULLED DOWN



A GOTHIC CARVED LINTEL

PHOTOGRAPHED BY J VAN YSENDYCK



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## ILLUSTRATIONS.

LICHFIELD CATHEDRAL.—A COUNTRY ISOLATION HOSPITAL.—CHURCH OF ST. JOHN THE DIVINE, KENNINGTON.—NEW POLICE-STATION AND COURT-HOUSE, EXETER.—DESIGN PLACED FIRST FOR NEW BATHS AND WASHHOUSES, ST. GEORGE'S, HANOVER-SQUARE.—THREE COUNTRY HOUSES.—CARVED WOODWORK FROM YPRES.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## EXHIBITION OF ARCHITECTURAL PHOTOGRAPHS.

On Monday last, at the Royal Architectural Museum, an interesting collection of photographs was opened, and to-day we reproduce two typical specimen prints of Lichfield Cathedral, giving a detail view of the central portal of the west front, together with a more general representation of the façade, showing the arcading and statues which Sir Gilbert Scott, R.A., added, or rather replaced, a few years ago. The photographs exhibited are by Mr. John L. Robinson, A.R.H.A., of Dublin, who took them during the recent excursion of the Architectural Association Excursion. Among the larger views some of the most successful are those taken at Haddon Hall. Nos. 23 and 94 illustrate the ball-room, and show most clearly how incongruous the "graining" colouring is about which Mr. Hartshorn made such a fuss. Of course, the photographs cannot give the tint itself, but they indicate unmistakably how entirely out of scale the large figurings of the so-called grainings are in relation to the delicate detail of the woodwork itself. Prints Nos. 91, 92, and 93, on the other hand, show how much better the untouched panelling in the chapel, hall, and dining-room is as compared with the painted wainscoting in the long gallery. Nos. 18, 19, 20, and 21, as well as 70 to 97, are all devoted to this grand old mansion. The leadwork and grotesque carvings show particularly in those of the courtyards; while 97 displays the celebrated shaped trees in the steward's garden. The cut box peacock is an uncommonly good specimen. No. 96 furnishes a detail of the chimneypiece in the state bedroom, with the quaint figurework over, where Orpheus is depicted in the centre charming the beasts with music, the whole composition evidently being the work of the same artist who did the big frieze in the presence-chamber at Hardwick, which is one of the most remarkable specimens of hand-wrought plaster work to be seen in England, reminding one of the even more curious and larger friezes in the Hall of Weikersheim Schlosse, Gegen, in Germany—a florid production dated A.D. 1600, elaborated with animals and figure subjects in a very similar way to the Derbyshire examples. Lady Eleanor's green velvet and white satin embroidered bedstead in the state-room figures in No. 95, and is an exquisite specimen of needlework. Prince George, when Regent, was the last royal personage who slept in it. From Bake-well Mr. Robinson has recorded some views of the Celtic monuments and crosses (Nos. 99 and 100), and Dorothy Vernon's tomb (No. 101), too, in the south transept, with statues of the happy runaway pair with some of their "tributes

of affection" kneeling in a row in front of the plinth of the monument. No. 98 shows a curious aumbry in the same church. The magnificent Elizabethan and earlier tombs in Ashbourne church supply several subjects for the camera, and we have a fine impression of Banks' refined Carrara marble monument to Penelope Boothby, who died in 1791. Whether this kind of naturalesque sculpture is adapted for such a memorial remains a question of taste; but charming as the design may be, our preference must be accorded to the adjoining monuments of the Cokaynes from the time of Edward II. to James I., some of which the photographs show us. The church at Ashbourne figures by views taken both inside and out, the small prints Nos. 64, 65, 66, and 67 being remarkably good photographs of the interior. The Cavendish Tomb in Bolsover Church (No. 58), supplies some good Renaissance detail, and so does the series illustrative of the chimney-pieces in Bolsover Castle, Nos. 53, 54, 55, 56, and 11, with another from Hardwick in a perhaps more refined style and later date rather, No. 52. For sculpture of a really first-rate type we refer the visitor to photograph No. 9, showing a carved marble panel in which a well-arranged group of female figures is composed within a richly-treated frame over the mantelpiece in one of the bedrooms at Hardwick Hall. The folds of the draperies and the way in which heraldic carvings are introduced deserve special comment. Of Hardwick Hall itself Mr. Robinson has several studies, including some of the visitors in the gardens and the statuary with which they made themselves familiar. Groups of the party figure in prints 10, 22, and 25, the last being the best, and taken on the steps at Wollaton. Nos. 27 and 29 show the detail of John Thorpe's work very clearly, and in the latter the contemporary painting of the house is seen hanging in the hall. South Wingfield supplies some of Mr. Robinson's most successful pictures; the large ones (6 and 7) are both bright and good, but the small views (45 and 46) exceed them in merit and tone. The studies of Somershall Herbert, numbered 38 and 39, were taken in the rain, but as records of good half-timber building, are valuable. Sudbury Mansion comes out grandly in sheets Nos. 1 and 2, displaying the old English brickwork to advantage, and No. 41 furnishes a view at the distance from the gardens. Etwell Almshouses are shown by No. 3, and 4 and 5 give views of the church very prettily. Bradbourne Church figures in Nos. 16 and 17, showing the Norman tower and rich doorway; while Longford Church occupies plates 36 and 37. Wollaton Church is duly registered in those marked 102, 103, and 104, and the Matlock headquarters of the party comes to the front in the concluding sheets, 109 and 110. Other views of Lichfield, besides those herewith reproduced, include the interior of the choir, the north transept doorways, and some good details of the chapter-house. A general view of the cathedral will be found illustrated in the BUILDING NEWS for July 13, 1888. The exhibition will remain open free for about a fortnight.

A COUNTRY ISOLATION HOSPITAL.  
FOR description see page 397.

CHURCH OF ST. JOHN THE DIVINE,  
KENNINGTON.

THIS building is accounted one of the late Mr. Street's most successful churches, and it is one of the most important in the south of London, with extensive schools and parochial buildings. The inclining inwards of the last bay of the nave arcade is a feature in the design, giving internally a fine effect, coupled with the vast roof of wood, like groining, which spans the area. The materials within and without are red brick and stone, the choir being groined in the latter material. The aisle windows are richly traceried in varied designs, and the stained glass in the church is very good; while all the fittings and altar furniture, vestments, &c., are unusually valuable. Messrs. Dove Bros. were the builders of the main fabric, which has remained unfinished till now at the west end. Here, under the supervision of Mr. Arthur E. Street, M.A., the great tower and spire seen in our illustration is being built, and the work at present has reached the belfry cornice. We hope, at an early day, to give some geometrical drawings of this structure.

NEW POLICE STATION AND COURT-HOUSE,  
EXETER.

THIS building, which has been in course of erection for some time, has within the last few days been officially taken possession of by those for whose use it has been erected. The work to be carried on in the building is the whole of that connected with the police, and also the magisterial business. This has previously been done at the old Guildhall, which is now being refitted for the use of the Town Council, and where the quarter sessions and assizes will continue to be held. The following accommodation has been provided in the new building: On the right of principal entrance, a charge-room leading direct to the cells, one of which is of large size for placing more than one prisoner in at the same time should occasion require it, and is built under the recommendation of the Government, who call it an "association" cell. In connection with this part of the building is a search-room, bath-room, and room for stolen property. The other accommodation on the ground floor comprises a clerks', detectives' and inspectors' offices, a parade room for the use of the constables, &c. The accommodation on the first floor consists of a room for the magistrate's clerk, a chief constable's room, consultation room for the use of solicitors, and a room for female witnesses. At the rear of main building, and approached by a central flight of steps from the principal entrance, is the Police-court, a room about 48ft. by 25ft., provided with suitable accommodation for carrying on the business, and with a gallery for the general public, having seats sufficient for about 100 persons. Adjoining the court is a magistrates' retiring room, access to which is not only had from the principal staircase, but also from a private staircase leading from a private entrance. Over the parade room accommodation is provided for a caretaker, and there are also two other rooms at a still higher level over another portion of the building. In the drill-yard at the rear is a mortuary and a post-mortem room, and the fire-escape will also be kept there in the daytime. There has been a somewhat different arrangement in the use of rooms from what was originally intended. The building is erected with local bricks, the outer walls being built in two thicknesses. Beer stone is used for the dressings of windows and doors, string copings, weatherings, and other portions of the building, and the roofs are covered with slates. The walls of the business portion of police-court have framing to the height of about 6ft., and those of gallery are boarded to the height of about 4ft. The ceiling of this room is formed partly in the roof, and is wholly of woodwork, the trusses being exposed to view, and boarded fixed at the level of collars and to the underside of rafters below that level. The acoustic qualities of the room are satisfactory. The joiner's work of principal portions is of pitch-pine, and this and other interior joiner's work is either polished or varnished. The greater portion of premises is heated with hot-air distributed through the building from a hot-water apparatus, and the vitiated air is drawn off from the court and other principal apartments to an extraction flue by heat from the heating apparatus when in work, or by a gas apparatus when the heating apparatus is not in use. In excavating for the new buildings some portions of old Roman pavement were discovered. These have been carefully preserved and relaid in one portion of the floor of principal staircase. The remaining portion of floor of staircase has been laid with modern marble mosaic of a pattern and colour similar to that of the old. The contract for the buildings is £4,750, and they have been erected by Mr. W. H. Gooding, builder, of St. Thomas, Exeter, from the design of Mr. John M. Pinn, architect, of Exeter. Messrs. Willey and Co., of Exeter, have supplied the gas-fittings; Messrs. Sarton and King, of Exeter, the heating apparatus; Messrs. Smith and Sons, of Birmingham, the locks; and Messrs. Paterson, of Manchester, the mosaic work.

NEW PUBLIC BATHS, ST. GEORGE'S, HANOVER-SQUARE.

THIS is the design placed first by the assessor in the competition for new public baths for the vestry of St. George, Hanover-square. Mr. James Weir, F.R.I.B.A., 9, Victoria Chambers,



Westminster, S.W., is the architect. The principal front, facing the Buckingham Palace-road, was intended to be of red brick, with terracotta or stone dressings, and the interior of the swimming baths to be in glazed bricks. The whole of the staff department faces the Buckingham Palace-road. The first and second-class swimming baths, and the whole of the private baths, are placed on the ground floor, with separate entrances, and the whole connected by passages and doors to secure an easy supervision and economical working of the staff; the superintendent's office being placed in a central position, for free and easy access to and from all parts of the building. A subway is provided in basement, with which towel shoots from the various baths are connected for convenient collection and removal of towels, &c., to the house laundry, which is in the basement at the Eccleston-street end of site. The public laundry is placed over the second-class private baths, and fitted with all requisite and most approved appliances. The ventilation of the whole of the washing department and private baths in the rear is by fresh-air inlets in the outer walls, the vitiated air and steam being extracted by means of a Blackman's air propeller by tubes and shafts, thus causing perfect freedom from steam. Two large tanks for supplying water are placed over the laundry. The swimming baths are arranged to be heated by (Roshier's patent circulating heaters) the most improved and economical process of equally distributing the heated water through the whole bulk by circular discs, insuring an even temperature throughout, and preventing any steaming from the surface.

#### CHIPS.

A parochial hall at Tretower, Radnorshire, was opened last week. It is built of local stone, with Bath stone dressings and a tiled roof, and was designed by Mr. J. L. Pearson, R.A., from whose plans the adjoining parish church was rebuilt in 1877.

During the past week the abbey church of Romsey has been re-seated with chairs in place of pews.

The Queen's prizes, 112 in number, including four national scholarships and one royal exhibition, which the Science and Art Department have awarded to students attending the Manchester board schools, were publicly distributed on Friday in the town hall by the Mayor of Manchester.

On the 13th inst. a stained-glass window was placed in Brereton Church in memory of the 19th Earl of Shrewsbury. The glass has been painted by Messrs. Burlison and Grylls, of London. The central figure is a representation of our Lord as the Light of the World, and on either side are St. John the Baptist and St. John the Evangelist, whilst beneath them are representations of the marriage feast at Cana, the feeding of the hungry, and the clothing of the naked.

A large gathering of the Tynemouth Corporation, their officials and servants, assembled in the town hall, North Shields, on Friday, for the purpose of presenting to Mr. C. T. Gomoszynski, the borough surveyor, with a testimonial on the occasion of his resigning the office, owing to the ill-health of his wife. Ald. J. Green, as chairman, made the presentation, which consisted of a handsome silver salad bowl and spoons, bearing the following inscription:—"Presented to C. T. Gomoszynski, on the occasion of his retiring from the office of Borough Engineer, Tynemouth, as an expression of appreciation and esteem. Sept., 1888."

The east window of the new church of Alveston has been filled in with stained glass as a memorial to the late Mrs. Bush. The stonework is decorated, there being three large lights. The length of the lower lights being considerable, admitted of a design of canopy work forming panels for a large group, designed to extend across the window and representing our Lord blessing children. In lesser panels are represented seated figures symbolical of Faith, Hope, and Charity. The window is the design and work of Messrs. Joseph Bell and Sons, of College-green, Bristol.

The contract for the making of the Yeaton, Rawdon, and Guiseley Railway was let on Wednesday week to Mr. H. M. Nowell, railway contractor, of Preston. The tenders numbered 26. The contract thus signed is for the construction of the whole of the line from the junction with the Midland Railway below Guiseley station, through Yeaton to the temporary terminus in Green-lane, Rawdon. The work will, it is expected, be completed by next August.

#### SOME ARCHITECTURAL NOTES FROM FRANCE.

(By the Author of "London Churches—Ancient and Modern.")

DIEPPE—HAVRE—CAEN—BAYEUX—LISIEUX—  
SEEZ—CHARTRES—PARIS—RHEIMS—LAON—  
SOISSONS—CAMBRAI—LILLE—CALAIS.

A HOLIDAY spent last year among the cathedrals and churches of Normandy and Picardy—notably Bayeux, Coutances, Rouen, Amiens, and Beauvais—left so many pleasant recollections of new ideas received that it was thought a similar trip taken this year to the more southern part of Normandy and the Ile de France might be attended with equally happy results.

Accordingly, on the glorious morning of Thursday, August 9, we embarked at Newhaven for Dieppe, where we proposed passing a few hours prior to departing for Le Havre. The two Dieppe churches are so well known to all students of foreign Gothic that an attempt to describe them would be a work of supererogation; still, there are a few points about each of these structures which must not be too lightly dismissed.

Of the two, St. Jacques is the finer church by far; taking it all in all, from the Early Pointed of its choir arcade and transepts to the Renaissance screens inclosing the choir and nave chapels, it may be looked upon as a very fine historic monument. The western facade is flanked by a very elegantly-proportioned tower, exhibiting an exuberance of that lace-like beauty of detail which charms us in spite of soberer reason telling us that it is not in stone such vagaries should be attempted. A judicious restoration of the west front of St. Jacques is sadly needed; indeed, the general aspect of the church externally, though delightfully picturesque, is forlorn and uncared for. Internally, St. Jacques, Dieppe, has a minster-like effect viewed from the west end; indeed, an hour might be profitably spent in examining the various styles, each of which finds its representative. Of singular elegance is the Lady Chapel, with its modern carved reredos, and walls of Renaissance glass—modern, however.

St. Remi charms us by the quaint Flemish character of the interior, with its thick, plain, round pillars, and its pews, which latter, if memory serves aright, existed about ten years ago in St. Jacques. In several of the Coutances churches they are still extant, while in the cathedral at Beauvais and the church of St. Etienne in the same city a "banc derrière le Maître autel" is let at a rather high figure. But we are digressing. The choir of St. Remi is not older than 1545, while the rest of the church, owing to the religious wars and other causes, dates as late as the Louis XIV. period, of which style the western facade, with its solitary tower, presents a pleasing example. In a church so late as St. Remi it would be useless looking for anything like delicacy of detail, yet the whole is so picturesque, despite its solecisms and clumsiness, that any attempt to "dandify" would take away its charm. Dieppe possesses two modern churches, but as they are so irremediably bad, criticism is wasted upon them. France is far behind us in her modern architecture; indeed, during the whole of our tour we hardly saw a French Gothic church of the Revival worth looking at, their exteriors being most lean and poor, and utterly wanting the poetry of our English churches, built after the resuscitation of Pointed art—notably Carpenter's church in Munster-square, or Butterfield's masterly conceptions in Margaret-street and Baldwin's gardens.

The railway journey between Dieppe and Havre is singularly uninteresting ecclesiologically. Harfleur's noble crocketed spire and Gravelle's elevated Norman church—both close to Havre—however, rewarded us at the end of the journey.

We were, nevertheless, amply gratified at Havre, whose Notre Dame, a curious mingling of Late Gothic and Palladian, seems hardly lofty enough for the head church of such a town as Havre, but it covers a large space of ground, and those who are sufficiently liberal in their architectural ideas may spend a pleasant half hour among its columned aisles. Despite its architectural solecisms, Notre Dame de Havre le Grace—to give it its full title—

pleased us. It has a long, unbroken vista from the west door, terminating in the painted windows of the apse, whose tracery, as that throughout the church, partakes of the unfoliated Flamboyant character one sees in Oxford College chapels. There is a great deal of painted glass, some ancient, but all in the landscape style so dear to the artists of the Renaissance. The aisles and chapels are separated from each other by Tuscan pillars, those forming the nave arcade taking the form of responds, while the alternate ones in the aisles are isolated. We admired some tasteful grisaille glass in the clerestory, and in the small circular windows above either side entrance. Externally, the unfinished S.W. tower, with its clumsy crocketed pinnacles, does not assist in giving the church any extra height, dwarfed as it is by the huge houses in the Rue de Paris.

The sea trip from Havre to Caen is a very enjoyable one, in fine weather, with which we were fortunately favoured, and in about three hours—two and a half of which are spent in open sea, and the remainder in the Orne, or its canal—the towers and spires of Caen came in sight, affording promise of a rich architectural treat.

We had, however, decided upon making a short stay at the seaside before commencing our ecclesiological researches, selecting Bernières as our halting place, a picturesque, scattered village, very primitive, and therefore far preferable to its more sophisticated neighbours—Luc, Langrune and St. Aubin. Bernières has a noble Late Norman and Early Pointed church, whose spire, the work as of an angel architect, is one of the most beautiful of the Normandy spires. An excellent drawing of this spire will be found in Nesfield's "Continental Sketches," also of the elegant trefoil-headed doorway to the west porch. One could hardly select a more charming spot than this for a few days' quiet sojourn. To say nothing of the architectural treasures presented by almost every village church in the vicinity, there is in front the fine open sea, with its excellent bathing, while on the other side lies the rich, fertile tract of country between Caen and Bayeux. Then, should the weather prove unfavourable for country excursions, a short railway journey lands one in Caen, with its treasures of ecclesiastical art; Lisieux and Bayeux are also within easy reach, so that, altogether, no ecclesiologist need repine should bad weather overtake him at Bernières.

The walk from this village to Caen proved very delightful on the morning of August 11th after a dip in the sea.

Passing through Langrune, we stopped to rest and examine its church—a cruciform structure, low and long, and with a finely-proportioned central steeple, which, however, has a rather forlorn appearance, since it has lost not only its squinches and broaches, but also the capstone and vane. Langrune church abounds in delicate detail; we especially admired the clustering shafts supporting the arches of the tower, also the elegant groining of its apse. With the nave we were hardly so pleased. The arcade is a low one of eight bays, with short piers and pointed arches; above is a blind arcaded triforium, and clerestory of single lancets. The effect of this is no doubt pretty as a "coup d'œil," but sober reason tells us that this triple arrangement is unsuited to a nave of such low pitch as Langrune. Resuming our walk, we soon reached La Chapelle, whose large modern church of Notre Dame de la Délivrance, with its twin spires, is visible at Bernières, and a good way beyond it.

We could not admire this church externally, being, like most modern Continental Gothic, lean and poor and quite unpoetical. It is cruciform in plan, and just east of each transept is a tower and spire, differing, however, in design. Beyond is a pentagonal apse with incipiently traceried windows, and at the apex of the roof a huge gilt angel; but internally this church is a most masterly conception, and entering it as we did from the sunlit square, were hardly able at first to distinguish its details, owing to the profusion of stained glass. Low arcades on either side of the nave admit to pentagonal chapels in lieu of aisles, and support a lofty clerestory of Early-traceried windows. The chancel is long, devoid of aisles, but richly arcaded beneath the



windows. Against the northern pier of the arch opening into it stands an image of the Blessed Virgin and Holy Child, both attired in long blue robes. They are placed beneath a spiral canopied niche, reminding us of one of the German Sacrament-häuschen.

After a cup of coffee in the pleasant "place" in front of the church, we pressed on to Caen, arriving there after a thoroughly enjoyable, because so diversified, walk, about five o'clock, but without coming across anything very noteworthy in an ecclesiastical point of view. Having dined at our hotel—the excellent one in the Place Royale—and exchanged our "flannels," &c., for costumes more suitable for the streets of Caen, we began a round of the churches, notes upon which we propose giving in the order visited. Proceeding first to the modern church of Notre Dame de la Gloiriette—an Italian structure on the "motif" of St. Roch at Paris, but containing nothing very remarkable beyond the finely-carved organ-case and baldacchino over the high altar, we quitted it for St. Michael de Vaucelles, to which a pleasant walk across some fields and along the banks of the Orne led us. This is a very interesting church, consisting of a low, cavernous nave without clerestory or triforium, a Norman tower on the south, and a very lofty square-ended chancel. From the flight of steps leading to the Italian façade a fine panoramic view of Caen is obtained. This church is chiefly Late Decorated; in the same style is the fine large cruciform church of St. Jean, in the street of that name, with its two unfinished towers, the western one having those reed-like shafts to the belfry stage so common in the Caen district, the central one Renaissance. No good general view of St. Jean can be obtained, shut in as it is on three sides by houses; but of St. Pierre, a structure which from the large size and juxtaposition of its clerestory windows ought to claim the title of "The Lantern of Normandy," views can be had from any point. The erection of St. Pierre seems to have occupied almost the entire duration of the Pointed styles, for the church consists principally of First and Middle Pointed work, while its apse and fringe of chapels show the unsparring labours of an architect of the Renaissance. Curious and interesting though they be, these chapels ill accord with the rest of the building; and one looks in vain for a style like our Perpendicular to blend the two—the transition is too sudden. The arrangement of the apse clerestory windows reminded us of Street's noble vaulted sanctuary at St. Saviour's, Eastbourne. Those who only know the interiors of the Renaissance chapels at St. Pierre from Roberts' and Prout's pictures, can form no idea of their present appearance, teeming as they do with sculptured figures and altarpieces, and glowing with a profusion of rich Neo-Gothic glass. Space forbids us to dwell further on the many beauties of this noble fane, the only defect of whose interior is that it is too light, easily accounted for by the immense size of the clerestory, and the absence of stained glass which may at some period have graced them. From St. Pierre we strolled up to the Abbaye aux Dames, or Church of La Trinité—symbolised in the three figures holding a scroll within the tympanum of the restored western portal. Here again the Renaissance architect has shown his contempt for earlier and purer forms by substituting work of his own at the tops of the western towers. That the original work was removed is clear, from the fact that the whole of the south-east angle turret of the south tower still remains, and one can plainly see where the arcade was cut away. Although more ornate than the sister church of St. Etienne, the Abbaye aux Dames is richer Romanesque; remarkably elaborated are the westernmost bays of the nave between the towers. The nave alone is used for parochial purposes, its last three bays being screened off for the "chorus-cantorum" and sanctuary, the parochial altar standing under the western arch of the lantern. Eastward of this, the transept space is reserved for the *malades* and *sœurs* of the adjoining large hospital, for whose benefit an altar has been reared, backing against the parochial altar. Did the Abbaye aux Dames contain nothing else, the two exquisite First Pointed bays of the south transept would alone be worth coming to see; they resemble the nave arcades at Wells, but are somewhat loftier. In walking hence to the Abbaye aux

Homes, we noticed two desecrated churches—St. Gilles, opposite the Trinité, and St. Etienne le Vieux, both fine specimens of Middle Pointed, which God grant may at no distant date be restored to their sacred uses. The great pile of the Abbaye aux Hommes has, viewed from the east, a rather strong Teutonic character, with its spires, central steeple, and pinnacles flanking the apse, and recalls one of the Rhine churches, notably that of Spire. Throughout, the work is bolder and ruder than in the church of the Trinité, ornament in the nave at least being conspicuous by its absence; but the choir in First Pointed is very elegant, and there is some good modern glass in the clerestory of the apse. Very beautiful features are the small rose windows lighting the triforium passage in the choir, peering through the unglazed opening in a very felicitous manner. Other noteworthy features are: the clusters of columns between the chapels in the choir aisles, which, with their First Pointed stained windows, brought to our recollection very strongly Canterbury; the plain but massive Henri IV. stalls in which we sat to hear the High Mass on the following morning; and the open lantern above the tower arches. Early on the next morning we were strolling in the little churchyard of St. Ouen, a picturesque Late Gothic church, with its "saddleback" tower filling up the angle between the south aisle and transept. In the afternoon we took train over to Bayeux for the purpose of attending Vespers, but found so much to enchain our attention in the cathedral on their conclusion that it was not until late that we could tear ourselves away. It is in its proportions, which are nearly assimilated to those of our own cathedrals, that the charm of Bayeux lies; nothing is distorted or overstrained, and there is a repose about it which is eminently satisfactory, though we could not bring ourselves to admire the bulb-like dome of its Flamboyant central steeple. Perhaps no church in Normandy abounds in such exquisite detail as Bayeux; indeed, it is a hard matter to decide what to admire most—its Norman nave arcade, its First Pointed clerestory and choir, or the magnificent Early Middle Pointed of its transepts. The choir seems almost to realise the very perfection of First Pointed beauty, so elegant and graceful are the combinations of clustering shafts and multitudinous lancets. It is, however, only when standing in the aisles that the real height of the piers is apparent, the choir standing on a raised crypt, from which into the transepts is a lofty flight of steps. Such an arrangement is highly picturesque. The Renaissance stalls which formerly stood under the lantern have been removed into the choir proper, and placed, as at Wells, between the piers, together with the small choir organ-case. They present a *tout ensemble* of considerable richness. We were also much struck, in making the tour of the chapels in the choir, by the almost total absence of trumpery, all the altars, with their predella, being in Mediæval taste.

The early part of Monday, Aug. 13, was spent in the at present un-Haussmanised town of Lisieux, with the interior of whose fine Early Pointed church of St. Pierre we were deeply impressed. A resemblance to Notre Dame, Paris, is observable in the circular piers, with their Corinthianising capitals; while in the clerestory of the nave there is a strong likeness to Coutances. The apsidal choir of Lisieux might be the twin sister of that at Bayeux, such a striking resemblance does it bear; but Lisieux has been more fortunate than Bayeux inasmuch as its apse piers have escaped that attempt to "beautify" by fluting, which has irremediably spoilt those at the latter cathedral.

Passing through Mezedon and Argentan, neither of which contained much to interest, but much disappointed at not being able to visit the grand church of St. Pierre sur Dives, we were amply gratified at Seez, whose cathedral may be compared in its architecture with Coutances and Lisieux.

These three structures are unlike indeed, but by no means different. Severe simplicity characterises Lisieux; elegance, abounding in decoration, distinguishes Coutances; Seez, while it unites the excellences of both, can rival neither in those which are peculiarly its own. It was dark when we stepped into the cathedral; but our first feeling was one of disappointment on being confronted by the bare

white wall which has been temporarily run up in the eastern arches of the tower and transepts during the rebuilding of the choir. This has been in progress during the last ten years, and is likely to drag through another decade judging from the deprecatory shrug of the shoulders which was the sole answer to our question as to when it would be finished.

Nearly every one is acquainted with the huge western portal of this cathedral through the pages of the various architectural journals, &c., but few are familiar with the details of the building itself, the leading features of which are the western spires, the tripled lancets in the nave aisles; the more advanced Pointed windows in the clerestory; the absence of central tower or *flèche*, a feature which becomes rarer the further south one goes; the huge rose windows in the transepts; and lastly, the short and, as we have said above, dismantled choir, which, as well as the transepts, is Middle Pointed. Seez Cathedral abounds in the most exquisite detail, much of which, however, is fresh from the restorer's chisel. It abounds chiefly in the inner and outer portals of the north transept, and in the small porches beneath the western towers, which, at the time when Cotman made his series of drawings of Normandy (about 1820) were quite concealed by houses, and even now are inclosed with boards—seemingly just as Norman Shaw shows them in his "Continental Sketches." Although the dead wall at present filling up the eastern arches of the crossing and transept materially impairs the general view of Seez Cathedral internally, there is much to admire in the part open. In the nave we especially admired the enormous height of its huge circular piers, each with its vaulting shaft on the nave side, and the noble series of tripled lancets lighting the aisles. Seez being one of the very few cathedrals retaining the basilican arrangement, the high altar stands under the crossing, and is surrounded by a fine marble pavement. The two easternmost bays are screened off for the "chorus," and separated from the nave by a marble balustrade. We could not admire the backs to the stalls, a tall mass of wood painted in imitation of white marble, but enriched in the centre of each compartment by a carved subject within a medallion. The same type of inclosure to the choir exists, though in a richer form, at Chartres. Seez is a very quiet old South Normandy city, in the midst of lovely country, but if we except a very rich modern Romanesque chapel attached to the Petit Seminaire, is quite devoid of architectural interest, after the cathedral.

Having a wait of several hours at Dreux, owing to the awkward timing of the trains to Chartres, we had ample leisure to visit its fine, chiefly Flamboyant, church, and the mausoleum of the Orleans family, a curious jumble of Grecian and Gothic, though by no means displeasing. A run of about an hour landed us at 7 o'clock at Chartres, the huge mass of the cathedral towering grandly above the city, seen in the dim distance across the golden plain of La Beauce.

(To be continued.)

The foundation-stone of the Wesley memorial chapel at Epworth, Lincolnshire, was laid on the 20th inst. The scheme embraces the erection of a chapel, a school, and a minister's house. The site of the proposed buildings is in the main thoroughfare, and will be disposed on the sides of a quadrangle, in the middle of which will be placed a statue of John Wesley. Mr. Charles Bell, of London, is the architect, and the tender of the builder, Mr. H. Kelsey, of Epworth, is just under £3,000.

The memorial of the late General Gordon in Trafalgar-square is approaching completion, the stone base being nearly ready for the reception of the statue, which has been executed by Mr. E. J. Boehm, R.A. The cap of the pedestal is adorned with carved ribands, bearing the words "Gravesend," "China," "Soudan," and others entwined in foliage. The site of the memorial is between the fountains.

The new police buildings, erected by the county authorities in Stanton-street, Sutton Coldfield, were opened on Tuesday. The building has been erected according to the plans of Mr. Laite, the county surveyor, the contractors being Messrs. Jones and Lloyd, of Sutton Coldfield. The structure is of Gothic style, the walls of red brick with Bath stone dressings. The cost is upwards of £2,000.



## Building Intelligence.

**ASHTED.**—A sum of about £2,000 has just been laid out in the alteration and repair of St. James's Church, Ashted, near Birmingham, and the building was reopened on Saturday last. The main walls have been underbuilt upon a secure foundation of concrete, while the decayed timbers of the roof, which is of great span, have been taken out and reinstated. The old ceiling has been taken down and renewed, and the old floors repaved with wooden blocks laid on concrete. The chancel has been paved with encaustic tiles, and the steps rearranged. The old square, high-backed pews have been taken away, and modern seats constructed with the old oak. A new glazed screen has been erected at the west end of the church, and the space under the tower formed into a baptistery. The organ has been removed from the centre of the west gallery and reconstructed by Mr. Banfield on the north side of the church, and an oak reredos has been made by Messrs. Jones and Willis, from the design of the architects. Other works include redecoration of various kinds, and the provision of new external fences. The builders' work has been executed by Messrs. Jeffery and Son, under the superintendence of the architects, Messrs. Osborn and Reading, of 13, Bennett's-hill, Birmingham.

**BEITH.**—The Spier School, which has just been erected about half a mile from Beith, was formally opened on Monday as a higher grade school established under the scheme of the Scottish Endowment Commissioners. It stands within its own grounds of sixteen acres, including two inclosed playgrounds, three tennis courts, and a large cricket field. In the design the architect, Mr. Sellars, of Glasgow, has reproduced some of the features (particularly in the tower and the large gable in front) of the ancient college of Glasgow. In the north end of the buildings are situated four classrooms, which will accommodate ninety girls. The most prominent feature in the elevation is the tower, which rises to a height of 105ft. The main entrance is through the lower part of this tower, which forms a vestibule 12ft. square. The classrooms for boys are six in number, and will accommodate 180. On the first floor is the common hall, and entering from this hall is an apartment, formed in the tower, intended for the reception of some memorial busts of the Spier family. The heating is by hot-water pipes. A house for the head-master provides accommodation for boarders. The grounds have been laid out under the superintendence of Mr. W. L. Love, and this work, along with the cost of the building, is estimated at £12,000.

**CARDIFF.**—The erection of a new gate in North-road is about to be commenced by the Marquis of Bute. The principal object of the restoration is the provision of communication between the castle and the private grounds belonging thereto, which extend from Castle-road to Park-place. Hitherto any member of the family desiring to enter these grounds have had to cross the North-road; but this inconvenience will be entirely abolished, and a ready means of access provided along the parapet of the archway. The gate will be Early English in character, and of stone, in conformity with the castle generally. The span across the roadway will be 32ft. in width, whilst the footway arches on each side will be 8ft. wide. The plans, which have been prepared by Mr. W. Frame, architect to Lord Bute, have been passed by the works committee of the corporation.

**ELLAND.**—The new Town-hall, built from designs by Mr. C. F. L. Horsfall, architect, Halifax, at a cost of £7,000, was opened on Friday. The hall forms part of a block, comprising also eleven shops, with frontages to Huddersfield-road and Southgate, the two principal thoroughfares in the town. The front of the main building is ornamented with stone pilasters, and there is a balcony over the doorway, while from the roof rises a bell tower. There is sitting accommodation in the area for 810 persons, and in the gallery for 240. At the end opposite the gallery is an orchestra, the seats of which can be moved. On the same floor as the large hall is a room about

15ft. square, to be used as a committee room, and also two other anterooms. The chief contractors are—Mason, Mr. Thomas Pickles, Luddenden Foot; joiner, Mr. Joseph Wilson, Elland; and plumbers and glaziers, Messrs. S. and W. H. Jagger, Elland.

**GATESHEAD.**—The first section of a new hospital for sick children at Durham-road, Gateshead, which was illustrated in the BUILDING NEWS for Dec. 9, 1887, will be opened on Monday next. Only the administrative, or central block, has been completed. The edifice is of red brick, with stone dressings, having half-timbered gables and verandah. When the premises are complete there will be four wing wards, with accommodation for thirty beds in each, together with the usual day room, nurses' room, and others. The administrative block will be used as a hospital for the time being. The style is Domestic Early English. The accommodation is:—Board room, matron's room, nurses' room; also surgery, dispensing, and out-patients' room. Behind is a large kitchen, with open-timber roof. There are also a scullery, wash-house, laundry, pantries, and stores. On the first floor, what were intended for two front rooms, have, together with the corridor between, been temporarily formed into a ward, 44ft. by 18ft. There is also a day-room attached, as well as bedrooms for matron and nurses, linen room, bathrooms, and separate w.c. accommodation. Above this floor there are seven large attics, 10ft. high. Messrs. Haswell and Waugh are the contractors, and Mr. W. H. Dunn, Newcastle, is the architect.

**IPSWICH.**—The Edward Grimwade Memorial Chapel in the Back Hamlet was opened last week. It replaces a Congregational Chapel erected in 1871 on the opposite side of the thoroughfare, which has been converted into a Sunday school. The new building, which seats 800 worshippers, occupies a site parallel with the Hamlet, and measures 78ft. by 48ft. in its interior, whilst the addition of vestries at the east end make a total length of 100ft. It is built in modified Gothic style, the material being red brick throughout, with slated roof. The structure is divided into six bays, with a couplet lancet window in each, with the exception of that near the entrance, which is occupied by the gallery stairs and doorway. There is a circular window over the platform, and in the west end is a five-light window. All these are filled in with tinted cathedral glass in lead. The benching throughout is of pitch pine. The roof is an open tie beam queen-post structure. The lighting is by means of two Taj lights, each of 300-candle power, supplemented by brackets in the galleries. The system of ventilation adopted is Verity's. Mr. William Eade, F.R.I.B.A., of Ipswich, was the architect, and Mr. Fred. Bennett the builder; the cost has been £2,800. The cabinet-work and upholstery have been carried out by Mr. S. Peck.

**LIVERPOOL.**—Two hospitals for infectious cases, situated in Netherfield-road, North, and Grafton-street, South, Liverpool, and built by the Corporation at a cost, exclusive of the sites, of about £27,000, were formally opened on Saturday. Netherfield-road Hospital, originally a private institution, was taken over by the Corporation about two years ago, under the stipulation that 18 beds should be reserved for paying patients. It then consisted of a small administrative block and two pavilions of two stories each, connected by inclosed corridors. The Corporation have remodelled the two pavilions, nothing but the outside walls and the roof being left. The connecting corridors have also been removed, and also buildings which interfered with the free circulation of air. In reconstructing the pavilions four main wards have been provided in each, and four private wards in one and two in the other. Entrance to the upper wards is by an outside staircase, effecting a complete separation of the ground and upper floors. The total accommodation is for between 80 and 90 patients. There has also been erected a new administrative block, and in the rear a steam laundry and disinfecting rooms have been erected. A new system of drainage has been laid down, which has had the approval of Sir Robert Rawlinson. The materials used for the exterior of the building are grey bricks, with dressings of Ruabon red pressed bricks and terracotta. All the bathrooms and lavatories are faced with

glazed bricks, and the corridors of the administrative block are faced to a height of 5ft. with glazed tiling. The works have been executed from the designs and under the superintendence of the Corporation surveyor, Mr. Thomas Schelmerdine, by Messrs. Morrison and Sons, of Wavertree.—Grafton-street Hospital is planned on the pavilion system. The site is but little over two acres, of which one acre is absorbed by the provisions of the Public Health Act, which require a zone of open space between the buildings and boundaries of the ground. The new hospital contains accommodation for 69 patients in eleven wards, giving the maximum cubic and superficial space to each patient, as well as disconnecting and cross-ventilating each block. Three special wards are reserved for doubtful cases. Two distinct steam laundries, one for the patients' and the other for officials' clothing, &c., fitted with labour-saving appliances, form part of the scheme, and a high-pressure steam apparatus is provided for disinfecting bedding and clothing. The architects were Messrs. Simpson and Allen, London, and the contractors Messrs. Holme and Green, Liverpool.

**LEEDS.**—The Fine Art Gallery and Museum, which is being built in Centenary-street in continuation of the Municipal Buildings, will be opened next week. The architect is Mr. W. H. Thorp, of Leeds, whose design was chosen in competition, and the contract has been taken for £9,000. The building is placed in a side street, and is very plain in treatment. The ground floor will be arranged as a reading-room and sculpture gallery, the Central Museum Court, a top-lighted hall, 60ft. by 36ft., being placed between these. In the centre is a fountain executed in Burmantofts faience. Surrounding the Central Museum Court, and separated from it by lofty arcades, there are two museum rooms, about 60ft. in length, and as part of the inaugural exhibition it is intended that these shall be stocked with specimens of Leeds art industries. Suites of rooms on the upper floor will be devoted to the permanent collection; the dimensions are 42ft. by 36ft., 24ft. by 21ft., 42ft. by 32ft., 87ft. by 32ft., 65ft. by 25ft., and 60ft. by 24ft. All the wall surfaces are bonded to allow of fixtures being screwed to them, and are lighted by roof lanterns above coved ceilings, and the friezes are filled with Renaissance ornament. The floors are all fireproof. The walls are covered with fire-resisting paint, and the doors are of sheet iron packed with asbestos felting. The staircase balusters, columns, and decorative vases are of Hopton Wood stone. Messrs. Craven and Co. are the contractors for the building, and Mr. Brown, the Corporation clerk of works, has supervised the building operations. The electric light will be employed.

**NEWCASTLE-ON-TYNE.**—The new hospital for sick children, which has been erected at the Moor Edge, Newcastle, by Mr. John Fleming, Newcastle, in memory of his wife, was formally opened on Wednesday afternoon by Lord Armstrong, of Craigside. The style is Domestic English, of the 16th century. The buildings cover an area of 1,623 superficial yards, and the grounds are 3½ acres in extent. The hospital is built of Red Normanby brick, with smooth stone dressings from the Brunton and Wide-open Quarries. Messrs. J. S. Quilter and G. Wheelhouse are the architects, Messrs. J. and W. Lowry the contractors, and Mr. D. Amory has acted as clerk of works. The total number of children's cots is 63, of which eight are in isolated wards. The cost has been £23,000.

**WEST HANNINGFIELD.**—On Thursday, the 20th inst., the Archdeacon of Essex reopened the church of St. Mary and St. Edward, West Hanningfield, after restoration and reseating. In 1886 the tower and steeple were partially rebuilt and covered with slates by Mr. Carl Rother, of Frankfort, at a cost of £120. High deal pews and a western gallery continued, however, to disfigure the interior. The latter has been removed, and the pews have been replaced by pitch-pine seats, which had been removed from another church to make room for oak, and these proved more than sufficient to reseat the church throughout. The old flooring of white brick and decayed boarding has been taken up, blocks have been laid down under the seats, and Staffordshire tiles in the aisles. The chancel now stands two steps higher than the nave and south aisle, and within the altar



rails there are laid Minton's tiles. An old altar tomb built into the wall has been restored to its original position, and serves now as a credence table. The pews in the chancel used to face westwards; the sittings here now face north and south. In front of the east window there has been placed a reredos, designed and painted on panels by Miss Tiddeman. The cost amounts to about £400. The work completed this year has been executed by Mr. John Rayner, of East Hanningfield.

#### CHIPS.

Herne Bay was *en fête* on Wednesday week, on the occasion of the unveiling of a drinking fountain and the dedication of a sheltered seat, the gifts to that town of Major and Sheriff Davies. The fountain is of Portland stone, and has been designed and erected by Mr. F. G. Anstey, of Alpha-road, Regent's-park, at a cost of over £200.

Two new statues are about to be erected in Paris—one of Admiral Coligny, by M. Crauk, to be placed behind the chevet of the church of the Oratoire du Louvre, the other of Le Verrier, the astronomer, by M. Chapu, which will stand in the Cour de l'Observatoire.

On Wednesday week memorial-stones of the new Baptist schools, now in course of erection in Marton-road, Middlesbrough, were laid. The schools are of Romanesque design, and are being built by Messrs. John Pounder and Son, from plans by Mr. Moore, at a cost of £1,200, exclusive of cost of site and furnishing.

The authorities of the Louvre have accepted as bequest Ary Scheffer's well-known picture, *Christ au Roseau*.

A new hospital, erected at a cost of about £10,000, was formally opened at Great Yarmouth on Friday. The hospital, which is in the Italian style, has been constructed on the pavilion principle, with accommodation for 44 patients.

Memorial stones of a new Primitive Methodist Chapel were laid in Lane Head, Brighouse, on Saturday. The site of the new building, for which Mr. T. Howdill, of Leeds, is the architect, is on ground adjoining the present chapel, which will be henceforth used as a school.

The ancient cross in St. Thomas's-square, Monmouth, has just been restored at the cost of Mr. Crompton Roberts. Mr. F. A. Powell, of Monmouth, was the architect; the new panelled shaft and its head are by Mr. Wall, of Newport, Mon., and the foundations, and three steps on which the old base is raised, have been carried out by Mr. W. Simmonds, a local builder.

New schools in connection with the Roman Catholic Church of St. Mary Magdalene, at Seaham Harbour, were opened on Monday. The cost of the whole has been £1,193, or £3 15s. per head. Mr. Edward Weatherley, of Newcastle-on-Tyne, had the contract. The architect was Mr. James C. Parsons, of the same city.

A stained-glass window has been placed in the church of St. George, Easton-in-Gordano, by the surviving brother and sister of the late Sir Philip Miles. The subject is "The Angel appearing to Mary," and the work was carried out by Messrs. Bell and Sons, of Bristol.

A bishop's pastoral staff was presented to Dr. Moorhouse at Manchester Cathedral on Tuesday. It is formed of a shaft of ivory relieved by mounts of silver embossed, gilt, and embellished with precious stones. The shaft terminates in a capital ornamented with foliage (of the Decorated period) formed of silver and surmounted by an entablature bearing eight enamelled medallions representing the Four Evangelists, alternated with other emblems. Above these are pinnacles and crochets of silver. The inside curve of the shaft enriches a carved ivory group representing the Good Shepherd. The staff was designed and executed by Messrs. Thomason and Co., of Manchester and Birmingham. It is 5ft. 10in. high.

St. Peter's Catholic Church, Lytham, was reopened on Sunday week after decoration, from the design of Messrs. Pugin and Pugin. The internal walls have been wainscoted in oak, and a new pulpit has been erected, these having been carried out by Mr. Eaves, of Blackpool.

A new Theatre Royal has been erected at Bolton, and special attention has been paid to the ventilation, the latest improved form of Robert Boyle and Son's patent self-acting air-pump ventilator being adopted for the extraction of the vitiated air.

The memorial brass and window which have been erected at the Seamen's Church, Prince-street, to perpetuate the memory of the late Rear-Admiral Bedford Pim will be unveiled on Wednesday next. Messrs. Wilkinson and Warren, of Exeter, are the architects; Mr. Anderson, of Bristol, executed the brass.

## Engineering Notes.

**SOUTHEND-ON-SEA.**—The Southend local board have sealed a contract with Messrs. Arrol Brothers, of Glasgow, for the construction of a new pier to take the place of the present unsightly wooden structure. The amount of Messrs. Arrol's tender is £43,484 11s. 2d., this being exclusive of the superstructures and the tramway, which will be tendered for separately. The cost of these two items, together with the engineer's commission (6 per cent.) and contingencies and extras, bring the total cost, in round figures, up to £60,000. The contract is divided into three sections, the first being for a double-deck pier, about 200 yards in length, from the existing approach up to and including a concert-room capable of seating over 1,000 people. The tramway in this section will be below the promenade, which will be about 40ft. wide. The second section is a combined tramway and promenade pier about a mile in length—viz., from the concert-room to the present pier-head. This will be 20ft. wide, 12ft. being reserved for promenading purposes, and the remainder for the tramway. The third section is a pier-head, to be erected just outside the present one, and having three landing stages suitable to the different sets of the tide. The main portion of the pier will be built of iron; but the pier-head will be of wood. The time allowed for the construction of the pier is seven months for the first section, twelve months for the second, and fifteen months for the third. These periods run concurrently. The engineers are Messrs. Brunlees and McKerrrow, of London, under whose supervision the work will be carried out. It is proposed to work the tramway by electricity. The local board have just commenced to make a direct road between Southend and the adjoining village of Prittlewell, which will practically unite the two places as one town. They will also shortly complete the purchase of the foreshore from the lord of the manor.

**TONBRIDGE.**—The new county bridge over the Medway at Tonbridge was publicly opened on Wednesday week. The county authority undertook to build a new bridge if the town would provide improved approaches commensurate to the size of the new structure. This the local board did by purchasing the sites of the shops on the north-western side, the old property being pulled down and the road widened. At the other side an arrangement was made with the owners of the Castle Inn for the rebuilding of the old hostelry and throwing in a strip of land to widen the road. This has resulted in a building of the Elizabethan style, with a terrace overlooking the river, taking the place of the original building. The plans for the new bridge were prepared by the county surveyor. The builders' work has been carried out by Messrs. Wallis and Clements, of Maidstone, who obtained the contract at £2,146, and the whole of the iron work was cast in the town itself, Messrs. Gray Bros. having been successful with their tender of £1,359.

The Roman Catholic Bishop of Southwark opened, on Tuesday, the new schools for junior boys at Beaumont College, Old Windsor. The new building, which is in the rear of the college, will accommodate nearly 100 boys. It consists of a chapel, study-hall, and refectory, with school-rooms and classrooms, and dormitories above. The architect is Mr. Bentley. The style is Early Renaissance, the chapel alone being Perpendicular in character.

A meeting of the creditors of Thomas Toward, contractor, of Shildon, Durham, was held at Sunderland on Tuesday, when the liabilities were shown to be £37,782, with a deficiency of £22,172. Toward has absconded, and a warrant is out for his arrest on a charge of raising large sums of money by means of duplicate conveyance deeds.

The finance and estate committee of the Liverpool corporation offers premiums of £100 and £50 respectively for designs and plans for erecting shops and other business premises upon the land situate at the corner of Church-street and Parker-street in that city.

The exterior of High Wycombe Church is about to be restored from plans by Mr. J. Oldrid Scott. Mr. Silver, of Maidenhead, has taken the contract for the work at £2,640.

#### COMPETITIONS.

**ARDWICK.**—The design submitted in competition by Messrs. Smith, Woodhouse, and Wilmoughby, architects, for the Lyon-street Infant School, Ardwick, for the Manchester School Board, has been selected. The competition was a limited one.

**GALWAY.**—The Board of Guardians decided to obtain designs for medical officer's residence, dispensary, and offices at Oranmore. The plans were submitted to a committee of the board as assessors, and their award has been in favour of Mr. Francis F. Perse, of Loughrea. The board have accepted the award, and have instructed the architect to proceed with the work.

**WESLEYAN METHODIST SCHOOLS AND CHAPEL EXTENSION, LEYTONSTONE, E.**—In April plans were invited in competition from six architects, and on the advice of the referee, those submitted by Mr. George Baines, 4, Great Winchester-street, E.C., were selected. Since this decision the committee have purchased an adjoining house, and propose to carry out a much larger and more comprehensive scheme, in sections, from the designs of the above-mentioned architect. Tenders for the main school-room and chapel extension have been accepted, the work to be commenced on the 1st March.

#### ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

**YORK ARCHITECTURAL ASSOCIATION.**—The third excursion of this society for the summer session took place on Saturday, when Middlesbrough was visited. At that town the members were met by Mr. Walter H. Hoskins, who at once led the way to the Municipal Buildings, recently erected from the designs of Mr. G. G. Hoskins, of Darlington. The design is Gothic, founded on that phase of the art which prevailed in this country during the thirteenth century. The Town Hall occupies the northern part of the site, is separated from the Municipal Buildings by a glass and iron covered carriage way, and is surmounted with a tower 170ft. high. The Municipal Buildings are arranged round a quadrangle, which is used as a drilling-ground for the police and fire brigade. The buildings provide accommodation for the council, the police, fire brigade, free library, reading-room, Water Board and Union offices. On the south side stands the council chamber, fitted up on the semicircular plan. At the conclusion of the inspection Mr. Hoskins entertained the members to dinner at an hotel.

William Martin, aged 46, of Holloway-road, and described by his counsel as an architect by profession, has been committed for trial by the Marylebone police magistrate on a charge of wilfully injuring ladies' dresses by throwing sulphuric acid upon them. Evidence was given in two out of many charges, and the defence set up was that prisoner was a dabbler in photography, and carelessly threw into the road a bottle containing the acid which happened to be in his pocket.

A large turret clock, with Westminster chimes and four automaton figures with five bells, has been erected at the American Markets, Cardiff. The clock has been made at the works of Messrs. Wm. Potts and Sons, clock manufacturers, Guildford and Cookridge-streets, Leeds, from the designs and plans of Lord Grimthorpe (Sir E. Beckett, Bart., Q.C.), and all his latest improvements inserted—viz., the double three-legged gravity escapement, maintaining power, compensating pendulum, horizontal cast-iron bed-frame planed perfectly flat, and all the bearings being of gun-metal screwed into the frame. The time is shown on a large external dial with the hands, figures, and minutes gilt. The figures, which are life-size, represent an incident in Sir Walter Scott's "Ivanhoe." The centre figures represent Friar Tuck and Richard Cœur de Lion, who strike the hours alternately. The quarters are struck by Robin Hood and Gurth the Swineherd, at whose feet is a boar. There are four bells for the Westminster quarters, and one large bell in the centre for hours. The clocks at the Imperial Arcade, Birmingham, and Thornton Arcade, Leeds, have been made and fixed by the same firm—viz., Messrs. Potts and Sons, of Leeds. The architect is Mr. Richards, Cardiff.

The name of Walter Graves, Winchester House, Old Broad-street, E.C., architect and surveyor, appears in Friday's *Gazette* in the list of adjudications in bankruptcy.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

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Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII., XLVI., XLIX., L., LI., LII., LIII., and LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

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J. B. (Hardy); you'll get them at half the price, and twice as nice, of the Burmantofts Co., Burmantofts, Leeds.—WOLSTON. (Burke and Co., 17, Newman-street, are the people for that work.)—PROTECTOR. (Verity's gun-metal sash fastener will suit you—there are no springs or screws in it.)—BUILDER. (You can get the best hemp scaffold cord at 28s. per cwt. at Hawkins and Tipson's, 122, Minories. We know nothing of the firm you mention.)—CELLAR. (Don't think you can better Farrow and Jackson's wrought-iron bins. You can have the necks of bottles outwards in one sort they supply, which we agree with you is desirable.)—DOUBTFUL. (The Falkirk Company, certainly; and the other people have ousted their reputation.)—MACHINIST. (Bell's asbestos lubricant—we always use it, and find nothing else as good.)—PROVINCIAL. (Duckett's waste-water w.c. will do; see advt.)

## Correspondence.

## ARCHITECTURAL PLAGIARISM.

To the Editor of the BUILDING NEWS.

SIR,—“When I used the word plagiarism it was in its broadest sense.” Dr. Watts observes that one half of the conflicts the world has engaged in would never have taken place if the point at issue, the proposition or thesis to be maintained, had been carefully defined. So it appears, then, that my opponent is basing his opposition upon a total misapprehension of the definition of the word plagiarism. He says: “I maintain that the most original men are those who, by patient study and heartfelt work, have collated and embodied the ideas of others, &c.” Very good. I agree with him. But I am not arguing about that; that is not a definition of the term “plagiarism.” Do you think plagiarism has anything to do with “patient study” and “heartfelt work”? Stuff and nonsense! Plagiarism is the very reverse of this. Plagiarism may be defined as a labour-saving machine. It is too lazy to study much, too lazy to work, so it takes a plate from the BUILDING NEWS and copies wholesale.

And what shall we say of the professional man, an architect (!), who cannot design a building? Is he an architect? Certainly not, it is a contradiction in terms. An important and essential function in an architect is a mastery of the principles of design, without which he cannot be described as such. These principles have been fully elucidated by Gwilt in his “Encyclopædia,” by Lord Aberdeen in his “Inquiry into the Principles of Beauty in Architecture,” by Palgrave, and even a lawyer, Lord Grimthorpe, architect, has condescended to teach æsthetic principles to the profession in an essay on architecture—I mean “A Book on Building.” So it is not of the slightest use to plead ignorance as to how or where a knowledge of these principles is to be acquired.

Your correspondent's notion that if a man have no ideas—no ideas, mark it!—of his own, the safer course were for him to steal from a brother professional, is grossly ridiculous; the safer course would be to make him a butcher or a baker. Why make that person of all persons an artist?

The plagiarist principle is carried now to such an extent in the profession, that a leading member thereof, calling upon me the other day upon a light and air question, substituted an old cork hat for a brand new silk one of mine. I suppose Mr. Calvert would find arguments to justify this sort of thing.

I say, therefore, and repeat, “that the works of living artists are not without their permission to be copied,” that for a professional man to do so would be simply an expression of incompetence, and if he were to do so it would be wholly derogatory to the professional character. —I am, &c.,

CHAS. R. GUY HALL, A.R.I.B.A.  
12, Lower Phillimore-place, Kensington.

## BARFRESTON CHURCH.

SIR,—In your issue of August 17 appeared an anonymous letter, bearing the signature “M.” reflecting somewhat harshly on me in my office of Rector of Barfreston. I should be obliged by your publishing the following statement of facts, which “M.” has, for doubtless good reasons, omitted to mention.

Last June I received the following letter:—

24, Old Bond-street, W., June 15, 1888.  
REVD. SIR,—It is stated in the public papers that it is your intention to pull down the west front of Barfreston Church, and rebuild it, with alterations. I earnestly beg you, as an architect and antiquarian, an Englishman and a Churchman, to do no such thing. You would incur everlasting disgrace. The church, which I have known from engravings these fifty years, is one of the choicest specimens of Norman work in the country, and it would be the grossest vandalism to touch it. I don't know who your architect is, but I say he is not worthy the name. He must be very ignorant or grasping. Architects are paid, unfortunately, by commission, and this leads to the commission of many an antiquarian sin in order to make the five per centum. I have been fifty years in the profession, and have had much to do with church architecture, and I conjure you not to commit such absolute atrocity. The old wall is stable in spite of inclination. The window would be better left as it is—it is interesting. If you need a bell-cot, put one in either stone or wood at east end of nave. The heating chamber is best under the vestry, and the chimney should be immediately adjoining side wall of chancel or church. It is easy to destroy but impossible to create; and whoever is engaged in damaging so precious a relic of the past as Barfreston Church will be sure to get, and will richly deserve, enduring reproach. I hope nothing has yet been done in this bad business. I shall try to run down and make a sketch, and see for myself the church's condition. I have the honour to be, Revd. Sir, your obedient servant,

PHILIP E. MASEY.

This letter I forwarded to Mr. J. P. Seddon, the architect for the repairs of my church. He remonstrated with the writer, and received from Mr. Masey an apologetical letter, which I saw.

Some time after this Mr. Masey called on me and asked for information as to what was intended to be done to the church. Thinking that the author of a letter accusing Mr. Seddon of being very ignorant or grasping had no special claims to courtesy, I complimented him ironically on his modest and courteous letter, and on his having solved the difficulty of warming the church by a heating-chamber under a non-existing vestry. I also congratulated him on having escaped an action for libel, to which his letter appeared to me to have laid him open. I refused him the information he asked, but offered him two alternatives—first, to apply to Mr. Seddon, who might perhaps tell him what he asked; secondly, to become a contributor to the repair fund, when the plans, &c., would, of course, be open to his inspection.

This latter formula I can recommend as a powerful styptic to stop the flow of unsolicited advice. In July I received the following gem:—

24, Old Bond-street, W., July 14, 1888.

REVD. SIR,—At our late interview you asserted that I had charged Mr. Sedding with doing grossly improper things. This was a false statement of yours. In my letter I referred to improper things which had been done, but the which could not possibly have referred to Mr. S., I having not the least idea that he was concerned in the matter of the restoration. That my statements are true of some, Mr. Sedding would probably bear witness. As regards the condition of the church, many things certainly require to be done; but I am quite satisfied that there is no probability of anything being effected during your term of office.

But, Sir, important though it be—the state of the church—the state of the Parson is more momentous still. To my mind, his state is spiritually one of decay and ruin. I pray God, Sir, for Christ's sake, to open your eyes, seeing you see not.—And am, Revd. Sir, your obedient servant,  
PHILIP E. MASEY.

In which the attempt to confuse Mr. J. P. Seddon, late of 1, Queen Anne's Gate, now of 23, Grosvenor-road, with Mr. Sedding, another London architect, seems to me more ingenious than ingenuous, and scarcely justifies the writer in accusing one of making a false statement.

The new roof of the chancel is to be proceeded with forthwith, so that, perhaps, Mr. Masey's prophecy may not be fulfilled. As for his prayers on my behalf, they have not yet availed to open my eyes sufficiently to see the wit, wisdom, courtesy, truthfulness, and piety which are, perhaps, latent in Mr. M.'s letters.

It seems pretty clear that Mr. Masey and the anonymous “M.” are one and the same, and with respect to the tradition of the church having been built by a Norman knight, &c., it may be of interest to know that this legend was invented by a former rector—J. Gillman, whose incumbency lasted from about 1837 to 1847, who himself told me the origin of the story—viz., that he, the rector, told it to an old parish clerk, and, to use the words of the celebrated antiquary, the late Jonathan Oldbuck, “it happening to hit the clerk's superstitious noddle,” the story became traditional, and has doubtless been accepted by many as old and genuine.

With apologies for the length of this letter, —I am, &c.,

E. AUSTEN, Rector of Barfreston.

## MILTON CHURCH.

SIR,—“Goth” is certainly very premature in his remarks upon Milton Church. Had he read Mr. Grant's report his note might have been modified. Nothing is to be done but what is absolutely necessary to keep out the wet above and damp beneath. The pews in question are about forty years old, as is the miserable little “scaffold” under the grand tower arch. None of the traceries are to be touched—a little pointing is all that is required in places. The slight remains of stained glass will be re-lead properly, the monuments all cleaned, as well as everything else.

The committee intend to make the grand old church decent (no one who enters by the tower can say it is now), and it is composed of men who will not fall asleep during the progress of the works.—I am, &c.,

FRANCIS GRAYLING.

19, Park-road, Sittingbourne.

## ROTHERHAM MARKETS COMPETITION.

SIR,—We shall be glad to co-operate with any competitor in an endeavour to get some compensation for our wasted time, if he will kindly communicate with us.—We are, &c.,

BORER AND DOBB,

Authors of “Phoenix.”

110, London-wall, E.C., 24th Sept.

A Local Government Board inquiry was held by Mr. Arnold Taylor, at Fullwood, near Preston, recently, with reference to an application from the local board of Fulwood for sanction to borrow £1,000 for works of sewerage. Mr. J. J. Myers, engineer to the local board, showed the scheme he has prepared for sewerage the district, and Mr. Condor gave details of the patent process he proposed to apply to the effluent.

On Tuesday week Colonel Ducat, R.E., inspector for the Local Government Board, held an inquiry at Stratford-on-Avon with reference to an application of the town council for leave to borrow a further sum of £1,700—making altogether about £22,500—for the purpose of water supply.



# Intercommunication.

## QUESTIONS.

[9763.]—**Hydraulics.**—What would be the discharge from a 2in. stand-pipe, placed on a hydrant at the lower end of a water-main, having a head of 200ft., and composed of 13 miles of 10in. pipes, 13 miles of 7in. pipes, and 500 yards of 6in. pipes, and assuming that each sized main had three sharp and six easy bends? I should be obliged if any reader will show me how this is ascertained.—**FIRE BRIGADE.**

[9764.]—**Discharging Sewage on Top of the Tide.**—I shall be glad to have the opinions of your scientific and practical readers as to the advisability or otherwise of discharging sewage on the top of the tide when the outlet is in the sea or a broad tidal river?—**CIVIS.**

[9765.]—**Emigration.**—Will any reader furnish a young architect, intending emigrating to New Zealand, with any information regarding same, as to what prospects of work he will have, outfit, instruments, &c., he should take out? An answer with intelligence of that or any of the other colonies as a field for emigration to the subscriber will be much esteemed by—**ANGUS.**

[9766.]—**Sapwood and Dry-Rot.**—Premising that by "sap" and sapwood I do not allude to the mere juice or sap in the wood not yet dried out, but to the immature outer rings of wood which have not yet matured to heartwood, whether such sapwood be green by exposure to weather, or by being carefully protected be scarcely perceptible, yet still sapwood—i.e., not heartwood—I should like to ask the following question:—Will the presence of sapwood on the edges of fir-timber (including in this term Swedish deals) set up dry-rot which will destroy the whole timber, heartwood included, under conditions that, if the whole of the timber had been heartwood, the dry-rot would not have occurred? I assume that dry-rot once commencing may attack all the timber, however sound; but is the sapwood likely to bring it to the heartwood when it would not have occurred had there been no sapwood to encourage it in the first instance?—**R.**

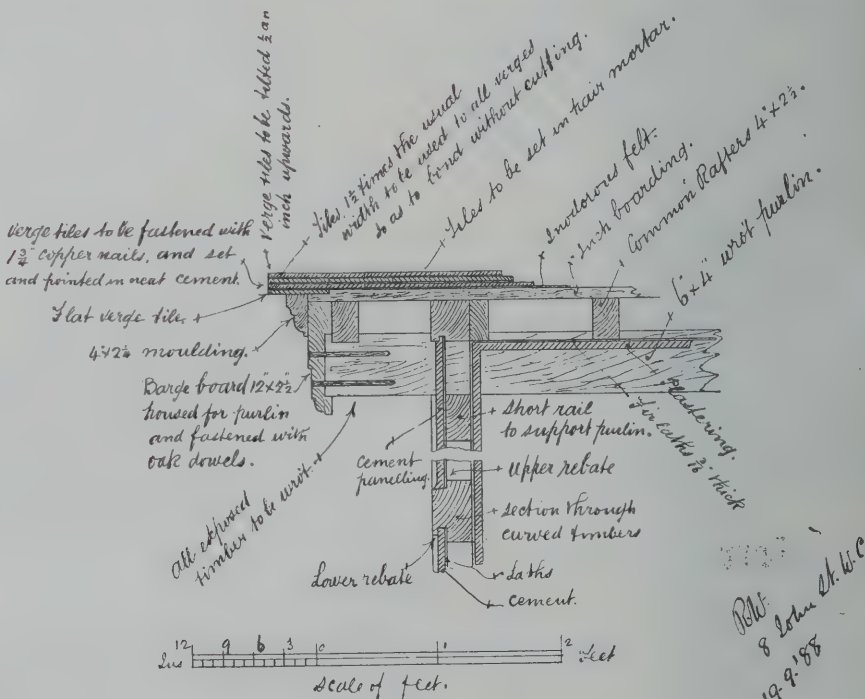
## REPLIES.

[9700.]—**Quality of Woodwork.**—If "Fairation" wishes to have durable timber for building, let him use for carpentry scantlings cut out of Memel logs of good quality, the smaller the scantling the better the quality required. If he wishes to keep down cost, then the small scantlings may be cut out of Petersburg deals. For joiner's work, use best Petersburg or Onega deals, or of qualities selected according to the required purpose of the before-named. It will be impossible for any but a practical man to distinguish this from any feature or marks. One test is weight: if both are equally dry, Petersburg deal will weigh much heavier than the common deals (Swedish, &c.). For a non practical man the best way is to provide for the production of invoices from a respectable merchant, with full description, who would be liable to prosecution if he made a false representation. It is practically impossible to obtain wood entirely free from sap and knots for a quantity of work; but a special portion, such as a staircase, may be selected from a large quantity of material, and is then distinguished as clean deal, and is, of course, exceptional, and beyond the term used in a specification of "free from sapwood, shakes, large or dead knots, many edges, or other defects" in this description, only a fair and reasonable sample from the best deals is expected. For "clean deal" in measured work a building surveyor would allow at least 3d. per foot suppl. extra on lin. deal above ordinary prices. These points were fully understood and acted upon by the last generation of architects and surveyors; but the total want of practical experience in the architect of the present day brings out these inquiries and produces innumerable blunders. If it is necessary for a surgeon to spend some years in studying the anatomy of the human body before he is allowed to accept a remuneration for his services, is it not equally desirable that an architect should thoroughly understand the anatomy of a building before he is allowed to deal with the funds of his client?—**DURABILITY.**

[9700.]—**Quality of Woodwork.**—In reply to "Fairation," the best wood to specify for carpenter's work, in my opinion, is as follows:—"All timbers—i.e., scantlings, &c., larger than 11in. by 4in., or longer than stripped, as sawn deals, &c., to be cut from medium quality Dantzic, Memel, or Riga fir, and to be a fair average as regards knots, &c., of this quality, no twisted or excessively sappy logs to be admitted (here specify if all sides or faces are to be sawn, or if any one or more may be the natural hewn face of the log; also specify if the wood is to be insisted upon as entirely free from sap, or what proportion in any section at any one place can be sapwood). A note might be made that any beams too large or too long to be obtained in the above class of timber to be of hewn or sawn pitch pine of approved quality. I may here state that it would be optional on the part of the architect to specify a higher or a lower quality of timber, or that the work should be carried out in hewn or sawn pitch-pine, which is not assorted into qualities in the log state; but it should be borne in mind that in large squares or long lengths of Baltic fir it would be unwise for other than the best or first quality to be used. The quality marks are all scribed upon the Baltic fir logs at ports of shipment, and these can be understood on reference to works upon "Marks on Timber, &c.," a very reliable one being that recently published by W. Rider and Son, London. The specification might proceed: "All timbers of less section than 11 by 4 to be of 4th quality Swedish fir of good shipments, or of 2nd quality Finnish do. do., the wood to be fresh and in good condition; any twisted, cross-grained, or excessively sappy wood to be omitted or thrown aside." It might be specified that all the woods should be free from sap; but it is little use doing this in practice, for it might mean throwing nineteen deals, &c., aside out of every twenty, and it is a foolish act to specify what is not intended to be carried out. It is far better to select a particular quality of a particular shipment, and insist upon the marks being on the end of the wood for the inspection of the architect. The favourite London stock, and one very often specified,

is Dixon's Sandarne and Swartwick goods, marked as follows—D. B. & Co. DDD, D, and MFD—for the respective qualities of mixed, thirds, fourths, and fifths. The Swedish stocks are invariably assorted into four qualities, as above; whilst those of Finland are assorted into three qualities—firsts, seconds, and thirds—the latter corresponding with the 5th Swedish of good shipments. It will be seen that a better quality of Swedish and Finnish sawn goods might be used; but the qualities I have noted would make good sound work, something above the average of work done under contracts which are loosely worded. In specifying Dixon's goods it must be borne in mind that although readily obtained in London it is by no means an easy matter to find them at other ports; it hence follows that the words, "or shipments of equal good quality" should follow. This would create no confusion, for there are a score of other shipments equally good, the marks of which are A, B, C, in the timber trade. I have dwelt somewhat fully on this point with the view of calling attention to this neglected detail in specifications. As I write I have the last issue of the "B. N." before me, where, at page 384, under the heading of "Practical Architecture, &c.," by a surveyor, it says, "The deals to be yellow Christiania, of best quality, and well seasoned." This is specifying a class of goods that does not practically exist, and has not been generally in the market for generations. It really means that the contractor can use what wood he likes, and it would be just as well not to allude to the subject at all. This is an example of a great number of specifications which are servile copies of originals belonging to a century earlier than the present one. As to joiner's work, that with any amount of exposure upon it, providing the section be not large, or the width great, as in the buttons and middle rails of doors, might be of mixed or thirds, Swedish fir-wood of Gefle, Soderhamn, or equal shipments, and all internal joinery to be of St. Petersburg, or White Sea fir-wood, of best or second quality (stating which). The White Sea wood is of the finest quality, and if the best be used, which is rarely indeed the case, very good work will result. The quality of woodwork is a matter entirely in the hands of the architect, who must cut his coat according to his cloth. He may dress his work in silk in satin, or in fustian or corduroy; but it is only fair to respectable contractors that he should clearly state what he intends to have. I could instance a customer of mine who, on principle, will not use any wood inferior to good Swedish fourths quality, who recently lost a large contract, which is being carried out by one of his neighbours in fifth quality. His complaint is not against his neighbour, but against the architect's specification that admits of such a loose reading.—**W. STEVENSON, The Park, Scarborough.**

[9750.]—**Barge Board.**—Appended is a section through barge board, drawn to scale.—**R. W.**



[9753.]—**Water Tables.**—The following formula gives the discharge of water through a notch in a thin plate:— $G = \text{gallons discharged per minute}$ ,  $d = \text{depth of overflow in inches}$ ,  $l = \text{length of weir in inches}$ ,  $G = d \times \sqrt{d} \times l \times 2.67$ , thus, with 4in. overflow a weir 6in. wide will discharge  $4 \times 2 \times 6 \times 2.67 = 128.16$  gallons per minute. For accurate gauging the depth should be measured by Francis's hook gauge, and not by a common rule, owing to capillary attraction, causing the water to adhere to the rule and to rise above its true height. "Practical Hydraulics," by Thomas Box, gives the tables "T. R." requires.—**J. S. P.**

[9754.]—**Professional Charges.**—"Frozen" is entitled to charge 2 1/2 per cent. on the estimated outlay, and 1/2 per cent. for procuring tenders. These charges have been sanctioned by custom, and are those given in the schedule published by the Institute.—**G. H. G.**

[9755.]—**Baywood.**—There is no difference between baywood and mahogany. Baywood is an old term for mahogany shipped other than from the Islands of Hayti or St. Domingo or Cuba—i.e., from the Bay of Honduras. This wood is now more commonly known in the trade as

"Honduras mahogany," or it takes the more detailed description of the port it has been shipped from, as, for instance, "Belize mahogany," from the port of that name in British Honduras. Compared with the mountain growths of St. Domingo and Cuba, it is invariably soft and pale in colour, the result of being grown on low levels, plentifully supplied with water. When drawn from the hilly districts it becomes hard and deep coloured—so much so that it is difficult to distinguish individual logs in a cargo from the softer logs of Cuban shipments. The nearest approach to the mahogany is the Cuban or Havannah cedar (*Oedrela odorata*); but as this class of wood comes to hand from Honduras and other soft-wood ports, forming parts of mahogany cargoes, baywood cannot in reality be cedar. Baywood may be a variety of the Cuban and Haytian or St. Domingian mahoganies, *Suietenia Mahogani*; but I should be inclined to doubt even this, and attribute the difference in texture, colour, &c., to the influence of soil, situation, and climate. Lastell ("Timber and Timber Trees," p. 174) says (after giving it the same botanical name as the harder and more costly mahoganies): "The quality of the wood varies very much according to the situation in which it is grown—that which is produced on a firm soil and in exposed places, and notably that grown in the northern district, being by far the best, while the timber produced on the low, moist grounds is generally soft, spongy, and inferior." The great volume of the softer and paler varieties of mahogany handled by the trade at the present time is shipped from Mexico, that is from the Gulf of Mexico, the southern portion of which is the Gulf of Campeachy, and it is not strictly correct to call this "baywood."—**W. STEVENSON, Scarborough.**

[9755.]—**Baywood.**—Is a species of mahogany, and takes its name from Honduras Bay, from which it is shipped. It is often also called "Honduras mahogany." It is lighter in colour and less close in grain than the better kinds of mahogany, such as Tabasco and Spanish, to which it is also very inferior in both quality and value. It is often termed "a bastard mahogany."—**ERIMUS.**

[9757.]—**Overhanging Trees.**—If the trees overhang, there is no easement in respect of them acquired by user. An authority on easements says that a man is not compelled to submit to the inconvenience of overhanging branches. Care must be taken only to cut off so much of the boughs as overhangs the land of the injured party. The case comes under that of Private Nuisances. It would be better to make a complaint than to take the matter in one's own hands, though the law allows the party aggrieved to abate the nuisance if he do not commit a riot.—**G. H. G.**

[9760.]—**House Drains.**—"Sanitary" must consider the volume of sewage to be discharged. Sewers up to 9in. diameter should have a velocity of not less than 3ft.

per second. Small sewers require a greater rate of fall than large sewers, and large sewers, on the other hand, must have provided a much larger volume of fluid, so that the proper velocity through them may be maintained.—**J. S. P.**

The oldest architect in the United Kingdom, Mr. John Griffiths, F.R.I.B.A., died on Friday at his residence, 6, Hanover-terrace, Regent's Park, aged 91 years and 10 months. He had been a Fellow of the Institute for half his lifetime, having been elected early in 1842, and practised for many years at Finsbury-place South.

An exhibition of pictures was opened at Wolverhampton on Monday, in the Art Gallery, by the mayor. The loans include one of Landseer's works, sent by the Queen, from Buckingham Palace, and also exhibits from the National and Liverpool and Manchester Corporation Galleries.



## LEGAL INTELLIGENCE.

**CHARGES FOR COMPETITION PLANS LOST IN TRANSIT.**—In the Higher Court of Griqualand West, Cape Colony, on May 23rd, the case of "Sydney Stent v. Gibson Brothers" was heard. The plaintiff, an architect practising at Kimberley, sued the defendants for damages for the loss of plans and specifications entrusted to them to be forwarded to Pretoria. In November last year plans and specifications for a hospital proposed to be erected in Pretoria were advertised for, and a premium of £25 was offered to the framer of plans accepted. Mr. Stent made alternative sets of plans and specifications, and forwarded them by defendants' coach. They never arrived, and Mr. Stent lost his chance of the premium, and also the further profits which would have come to him if his plans had been accepted. He did not claim for such prospective profits, but based his claim on the value of the plans, which he calculated on a scale of 14 per cent. on the estimated cost, amounting to £143. The defendants tendered £25 and costs. This offer was refused, and the question was simply one of amount of damages. Mr. Stent gave evidence as to the time spent on the preparation of these plans, and was corroborated by Mr. R. Scott Day, who estimated the value of the plans at £50. For the defence, Mr. Wright said that it was not necessary to engage the architect whose plans were accepted. The Judge President said: As to the point that plans unaccepted became the property of the building committee, having regard to the evidence, he was against such a contention. The advertisement was the contract between the parties, and he could not agree with the construction defendants had endeavoured to place on that document. Taking the evidence of Mr. Day and the offer of Mr. Stent, the Court awarded the plaintiff £50 and costs.

## STAINED GLASS.

**LYME REGIS.**—During the past week a new painted north-east window has been placed in the parish church in memory of the late vicar. The subject is that of our Lord's three-fold commission to St. Peter as narrated by St. John (chap. xxi.), the whole of the work being appropriately distributed over the four lights of the window. In the foreground are our Lord and His disciples standing near a fishing-boat by the Sea of Tiberias, while the background is aptly filled in with associations natural to an Oriental landscape. Several smaller openings and tracery work contain symbolical emblems of the Four Evangelists, a cross star in the centre, and a Divine monogram on either side. Through the base runs a panel of Perpendicular ornament bearing the words, "Jesus saith unto him: Feed my sheep." Messrs. Bell and Beckham, of Great Russell-street, London, undertook the work.

## STATUES, MEMORIALS, &amp;c.

**EDINBURGH.**—The fountain erected in the Canongate by Mrs. Home to the memory of her deceased husband passed into the hands of the corporation on Friday, when the Lord Provost's Committee authorised Mr. Sydney Mitchell, the architect, to remove the barricades. The design of the fountain is founded on that of the famous well at Pinkie, with, however, considerable deviation. The lower portion consists of a square base supporting four drinking basins. At the angles of the base are four columns attached to four square pilasters. The latter end in moulded capitals, from which spring four arches. Above these pilasters there is an architrave, frieze, and cornice. From the upper angles of the cornice rise four open arches or ribs, richly moulded, which cross the fountain diagonally, and, meeting in the centre, form a crown. The stone used is red sandstone from Corsehill Quarry, Dumfriesshire, and the shafts of the columns are of grey-stone from Binny Quarry. The whole design has a Scottish character, harmonising with its surroundings. The contractor was Mr. James Slater, Albert-street, Edinburgh. The cost was £300.

St. Andrew's Scotch Church, Rodney-street, Liverpool, will be reopened on Sunday, after re-seating with pitch-pine benches, and the erection of new pulpit, Communion platform, and vestibules. Mr. James Rhind, of Liverpool, is the architect, and Messrs. Holme and Green, of the same city, have been the contractors; the outlay has been £760.

The Littlehampton local board have recently completed works of stone pavements and kerbs, also tar pavements, at a cost of £2,193. Mr. F. Holland, of Littlehampton, being the contractor for the former, and Messrs. W. E. Constable and Co., of London and Matlock, for the latter. The works were carried out under the supervision of the board's surveyor, Mr. H. Howard.

## Our Office Table.

MR. FRANK WHITMORE, architect and surveyor, is nominated in the Charter of Incorporation for Chelmsford, granted last week, as the first mayor of the newly-constituted borough. Mr. Whitmore succeeds, in the position of head of the local authority managing the affairs of the town, a brother architect, Mr. Frederick Chancellor, who since 1881 has been annually elected chairman of the local board of health. The chief question which will come before the new municipal corporation is that of an increased water supply for the town.

"MISTAKES IN ARCHITECTURE" is the title of the free public opening lecture to be given by Professor Roger Smith at University College on Thursday evening next, the 4th Oct. He will deal with students' mistakes and those of architects. The classes will, as stated in our advertising columns, be resumed the following week, and include the three subjects of architecture, historically treated, construction, and practice.

A CURIOUS condition of St. Michael's steeple, Coventry, has been brought to light during the progress of the restoration now in operation under Mr. J. Oldrid Scott's direction. In the year 1818 the upper 24ft. of the spire was taken down and rebuilt. The builders at that time must have known that the steeple was out of the perpendicular, for they rebuilt the 24ft. exactly upright, so that previous to the present restoration there was a bend in the spire where the portion which had been rebuilt joined the old work. Yet it would appear that all knowledge of this had perished, for the discovery by the contractor at the commencement of the present restoration that the tower was not upright came as a surprise. When the discovery was made, Mr. Andrews, a member of the Restoration Committee, suggested that the steeple should be plumbed from the summit to ascertain the total deviation from the perpendicular. A wire was suspended without delay, and the leaning gauged. Now that the work is approaching completion, and the steeple is set upon its new foundations, steps have been taken to ascertain the full extent to which the steeple leans, the tests showing that the steeple is 3ft. 5½in. out of the perpendicular. The leaning is visible to the naked eye. From the far end of Grey Friar's Green, where the steeples of Christ Church and St. Michael's are nearly in a line, it is easily seen that St. Michael's leans to the left, whilst from Ford-street, near the City Mill, it is seen to lean to the right. The direction in which the steeple leans is 37° north of west.

A LARGELY attended meeting of plumbers was held on Thursday, the 20th inst., at the Burgh-court Room, Dundee, for the purpose of hearing addresses on the subject of "Technical Education." Mr. J. J. Henderson, architect, presided. Ex-Baillie McNeill said that every young member of the craft should seek to acquire as much information as possible in connection with his trade, and gave illustrations of how young men were benefited by technical education, explaining that the classes it was proposed to establish would afford special facilities in that respect. Professor Ewing thought the movement one of special interest, as it emanated from the trade itself. The object of the meeting was to make a formal request that the subject of the instruction of plumbers should form a portion of the syllabus of the newly-established Dundee Technical Institute. The plumbers took the lead among trades in this respect. As to the question of expense, the Plumbers' Company had promised a grant in aid, provided a like amount were subscribed locally. The clerk of the company then gave some statistics of similar classes formed in various English towns. At the conclusion of the meeting between forty and fifty plumbers offered to join the proposed classes.

THE utilisation of the lime waste from alkali works, now a worthless and objectionable refuse in the manufacture of Portland cement, has been shown to be not only practicable, but highly remunerative, by Mr. John S. Rigby, who has devoted much time and attention to the solution of the problem. The manufacture of cement from lime mud

will, it is expected, revolutionise the cement trade, and confer a benefit on alkali makers, in utilising what has hitherto been a nuisance and source of expense. The process having been shown to be commercially successful, the British Patent Portland Cement Company, Limited, has been formed, with a capital of £100,000, in £10 shares, of which two-thirds are offered to the public, to purchase and work all Mr. Rigby's patents and inventions, and the vendors invest the purchase money entirely in paid-up shares. Mr. W. Batchelder reports that the cement is of first-rate quality, and greatly increases in strength with age. 2½in. briquettes which he tested broke at a pressure of 1,053lb. and 1,210lb. after 7 days, 1,326lb. after 14 days, but 61 days after making were not broken with the strain of 1,612lb. For some time the Widnes Alkali Co. have made from 40 to 50 tons a week of excellent cement, which has found a ready sale locally. It is proposed to erect works at Widnes and St. Helen's, a continuous process being adopted, and, with an output of 1,000 tons a week, a profit of 18s. per ton is anticipated.

ONE of the most interesting visits made by the members of the British Association during their recent meeting at Bath was that to the Box and Corsham quarries. The visitors were conducted through three miles of underground workings by Mr. J. T. F. Turner, the secretary to the Bath Stone Firms, Limited, by whom the quarries are now worked, and an explanatory address was given by Mr. Hancock, the manager of the company. After luncheon, at the Town Hall, Corsham, the members visited Lacock Abbey, which is shown by documentary evidence to have been built of stone from the Box Hill Quarries, and noted how well the material has there stood nearly six centuries of exposure to the air.

## CHIPS.

The new Court Theatre, adjoining Sloane-square Station, was opened on Monday evening. It has been built at a cost of about £15,000, from plans by Mr. Walter Emden, M.S.A., and was illustrated in our issue of the 13th January last, and further described in that of the 30th March, p. 480. The style adopted is French Renaissance, and it is seated for 800 persons. The chief feature of the building is the large constructional use made of iron incased in concrete. Messrs. Holloway and Greenwood, of Loughborough Park Works, were the builders, and Mr. Stephen Egan, the clerk of works.

An addition has been made to the interior of the Old Meeting Church, Birmingham, by the erection of a panelled oak reredos and side wings. The centre portion, or reredos proper, is divided into five panels by buttresses of a bold character, terminating above the structure in crocketed pinnacles. The panels thus formed are filled by recessed and moulded arches with gables above, supported by columns with carved caps, the space between the arches and gables being filled with carved spandrels and tracery. Three of the panels are further enriched by having the background gilded and illuminated with suitable texts, the smaller panels between being filled by a carved scroll out in a very high relief. The side wings which run to the north and south walls of chancel form an arcading with traceried panels, being finished along the top by a carved and moulded capping. The work has been carried out by Messrs. Jones and Willis, of Birmingham and London.

On Saturday the corner-stone of a new store in connection with the Leeds Co-operative Society was laid at Hunslet Carr. In addition to the store there are also being erected four cottages, from plans prepared by Mr. W. H. Rawnley, architect, the works being carried out by the society's own workmen, under the supervision of Mr. J. Teasdale, manager of the society's building department.

A throne of carved oak has just been erected for the use of the bishop in the newly-constituted cathedral church of Wakefield. Mr. William Watson, of that city, designed the work, which has been carried out under his supervision.

At a meeting held in Grantham last week it was unanimously decided to erect a drinking-fountain, surmounted by a statue, to the memory of the late Hon. F. J. Tollemache, of Ham House, Petersham, Surrey, from a design by Mr. Charles William Smith, architect, of Buckminster, Grantham. The sculptor will be Mr. T. Woolner, R.A.

A new chancel, organ chamber, and vestries are to be added to the church of St. Luke, Darlington, from the designs of Messrs. Clark and Moscrop.







# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1761.

FRIDAY, OCTOBER 5, 1888.

## COPYING OLD WORK.

THE craze for reproducing old work for no other reason than that it is old appears to have interfered much with the development of the handicrafts connected with building. If we want to teach a student how not to do a work which is generally admired, we must tell him to copy it, as we may be sure then that the beginner will proceed in a very opposite and different way to that which the original artist pursued. This is the reason why we think the Home Industries and other associations which are endeavouring to teach handicrafts and arts to our youths have something that is wrong in their method of placing before a pupil or a class a piece of old work to copy before they have taught him to use his brains about some plain and useful article. There can be no better recipe to prevent a youth from thinking or exhibiting his native abilities than to tell him to copy with precision. It is the very way to check the development of ingenuity. The student so set to work begins at the wrong end: if it is a chest or a table-top he has to carve or inlay, he makes it the size of the original, and he follows line upon line of the old work without any reference to shape, the use or destination of the object, or the materials employed. Like the blind leading the blind, there is no apparent reason for this ornament or that cutting to the craftsman, who is closely intent on following every line of the original. The old designer and craftsman—more often one and the same person than they are now—went to work in quite another way. He designed the plain chest or table for his purpose, and then began to set about the decoration of its sides and top; having no pattern to follow, he bethought himself the easiest and best mode of carving the wood—the kind of treatment that was desirable—having settled which, he arranged his ornament to the best advantage, and introduced devices or subjects having some connection with the use of the article.

But the worker and the designer are now distinct persons, and so the learner of these ornamental arts is only taught how to copy the patterns of old work, or one prepared by a draughtsman. Those who are engaged in teaching these old and revived arts are satisfied if they can produce good copyists; designing is not attempted. Take the arts of inlaying and marquetry. The pupil is taught to execute a design in variously coloured woods; he is instructed to cut the veneers according to the pattern, to fasten them together in thicknesses by glue, to paste a sheet of paper on the surface, and to draw the design upon it, which is afterwards cut through by the fret-saw; the process is simply a mechanical one, and can be learned by anyone—the design is a distinct and separate matter prepared by someone who has no definite knowledge of the processes, the requirements of working the same, or the materials which are used. The youthful draughtsman in the architect's office is in the same manner set to copy designs for his instruction; we will assume it is the elevation of a building to be executed in brick and terracotta. He takes or ticks off the heights and distances, not knowing or caring why this length is so much, or that height so and so; what internal arrangement has produced this or that feature or peculiarity in the elevation, or what influence the materials have had in the design of the details or the general treatment of the façade. He repeats line upon line mechanically, like

a schoolboy copies a line of a caligraphic exercise without knowing anything of grammar or composition. This is the way architectural composition is now learned. No effort is made to teach the pupil to express structure or treat material in a logical manner; the design so copied is supposed to be suitable for another building of quite a different kind, and built with other materials, like stone. The copying draughtsman begins at the wrong end; he knows nothing of construction or building operations, nothing of technical processes in the conversion of materials, and so it is impossible for him to know anything of designing, as it was known by the original designer. The architectural draughtsman of the routine copying school proceeds, then, on very different lines to the real architect; he reproduces what the original artist has thought out step by step, and his influence on the working artist or artificer is prejudicial. It is again the blind leading the blind. The handicraftsman who knows his business works from the copy so made; he sees that the details are unworkable in the material, the sizes are awkward, producing waste in cutting; they are also unsuited to the purpose, but he has only to obey and copy. The details and working drawings prepared by draughtsmen of this class inspire a feeling among the competent workmen of distrust in the architect's practical knowledge; but, as a general rule, the evil of copyism is contagious: men learn their own trades in the same manner, copying old workmanship, saving the trouble of thinking for themselves *ab initio*. All copying, therefore, even of good old work, is not the way to instruct in the art of design; the designer, whether artist or workman, must be brought into acquaintance with construction and materials, either in the workshop or on buildings, and the closer and more intimate that acquaintance is the better. We do not say the crude supervisor of buildings or clerk of works will make a better architect than a man of education and taste without such experience, as many are disposed to assert, but there is no doubt that the contact with work and materials of the former is far more likely to produce the requirements of good architecture than a year's apprenticeship in the routine office of the architect in which designs and details are prepared in the usual way. The student or workman can go to the technical college and workshop, yet the chief point, the connection between the design and the execution, is wanting. So long as one class of students learn only to draw from good designs, and another class are brought up to understand simply the manipulation and processes of the workshop, we shall fail to produce real artistic designers. In the best ages both parts of the art were learned—the theoretical and the practical—simultaneously. Under the modern, separate, method of instruction the dominion of copyism is extending. It follows from our contention that both classes copy, for each is wanting in the other branch. The academical trained artist, French or English, whether a student of the Ecole des Beaux Arts or of any of the English Government schools, is taught only to copy old models or exercise his imaginative power without reference to construction and technical methods, and the pupils of our technical schools are in like manner trained to execute from designs without relation to purpose or material, prepared by mere draughtsmen. A progressive development of our handicrafts must be the result of teaching the workman to design as well as to execute, and this can only be initiated by architects themselves showing that they are willing to design in materials, and renouncing the copying of old work. One instance of the present method is seen in restoration.

The restoration of old buildings is carried

on in a haphazard manner, depending often on the funds at the disposal of the restoration committee, or on the views of the building owner. Indeed, small funds have been rather more of a blessing than otherwise, for we know of at least two or three cases of restoration and rebuilding where the shortness of the funds at the disposal of the committee has been a mercy in preventing wholesale spoliation and rebuilding. Many of our old churches would have suffered a great deal more than they have done, if those who have their custody had an unlimited exchequer. A few hundreds of pounds more or less would sometimes determine the fate of an edifice. As pointed out by a correspondent in our last issue, the workmen have little—too little, certainly—to do with buildings, and are, therefore, a class to whom the "Hints" published under the sanction of the R.I.B.A. come with little practical force. The building owner, the committee, and after them the architect, are the prime movers. They order how much is to be done, whether this or that part is to be taken down, if ancient pillars or tombs are to be removed. The larger the sum of money subscribed the greater is the temptation to pull this part down and restore that, or to rebuild. The working man has no voice in the matter. It is, perhaps, to be lamented that so much money has been expended in rebuilding our great cathedral churches. If a few hundred pounds had been spent in placing them in a safe condition and in substituting new for the very decayed stonework in parapets and pinnacles which threaten to fall, there would have been less grumbling at the wholesale destruction and rebuilding of nave, transepts and choir. Lord Grimthorpe has pointed out the "craze for copying glaring mistakes" in our cathedrals and churches, in "fine tooling" the front stonework, and carving and producing in the "restored" building that "dead level stoniness" which has shocked all artistic minds.

## THE SYMBOLISM AND ICONOGRAPHY OF EARLY AND MEDIEVAL CHRISTIAN ART.—II.

By GEORGE ASHDOWN AUDSLEY, F.R.I.B.A.  
(Author of "Handbook of Christian Symbolism," and several works on Architecture and Art.)

GLANCING from the pages of Vincent de Beauvais' encyclopedia to the sculptures of the north porch of the cathedral of Chartres, we observe how the same order and system are observed which obtain in the "Mirror of Nature." Distributed throughout the great arch of the central part of this truly magnificent porch are no fewer than thirty-six figure subjects and seventy-five single figures arranged in perfect order. The series commences with the creation of the universe when God calls beings into existence to love and worship Him; thence it records each mighty step in the great scheme of creation down to the time when Adam and Eve, disobedient and fallen from their high estate, are driven by the Angel from Paradise and condemned to toil and die. The last two subjects of this series are given in the accompanying sketch, from the lower part of the arch on the west side. In the higher one the Angel of the Lord stands in a threatening attitude with uplifted sword, whilst Eve, in an attitude of sorrow, and Adam, casting a longing and half-afraid look behind him, move away from the garden. The intention of the artist, in the relative position of the figures and the direction of their movements, must not be overlooked; and we direct attention to this at this early stage of our essay so as to impress the student of Christian art with the necessity of noting every detail in its works, if he desires to read their signification aright, and to acquire the power of analysis so necessary to thorough



comprehension. The fallen ones are driven towards the portal of the church; not outwards and away from salvation. The promise made to the woman is not forgotten, nor is the expulsion devoid of hope. In the lower and last subject of the series, Adam is represented digging the ground whilst Eve attends him, and both are draped for the first time as inhabitants of the cold and toilsome world. God stands now in the place of the threatening Angel, with His right hand raised in the act of blessing (according to the form of the Latin Church) the toil He has ordained. The figure of the man (unfortunately now mutilated) faces the outward world; but the woman still turns towards the portal—the Church which, in the fulness of time, was to be founded through her instrumentality. In perfect sequence to this, we find, in four of the great ribs of the deep arch, a series of figures forming the "Tree of Jesse," with representations of the ancestors of the Virgin.

Now we have to see how far the sculptor has followed Vincent in his "Mirror of Doctrine." A very brief survey satisfies us that this division has received its due amount of study and an adequate representation. In the same porch, in a series of about one hundred sculptures, are represented all the labours of the country, arranged in their proper seasons; followed by the chief mechanical arts as practised by the dwellers in cities; and concluded by personifications of the scientific and liberal arts.

Next in order comes the third great division of Vincent's encyclopedia, the "Mirror of Morality"; and, true to his source of inspiration, the sculptor of Chartres has proceeded with his scheme, developing it by a further series of one hundred and forty-eight sculptures. Here he preaches his sermon in stone, by reminding the beholder that man has not to work with a purely animal selfishness; but that he has to toil and use all his bodily and mental powers to the glory of his Creator. That man must conduct himself uprightly in all affairs of life, and pass a true and virtuous existence in preparation for a higher state. The sculptures which personify the virtues we ought to possess and cultivate, and the opposite vices which we ought to shun, occupy the ribs and bands which divide the soffit of the left arch. The virtues are of four orders—the theological, political, domestic, and personal—and are placed in direct opposition to the vices which are of a directly contrary nature. Of the iconography of these personifications we shall have to speak at some length in future sections, so need not enlarge on the subject here.

The "Mirror of History," which we have described as the universal history of mankind, from the day in which our first parents were expelled from the Garden of Eden to the time in which the great encyclopedist wrote, and thence onward, according to his imagination, to the final Judgment Day, occupies, in its representation, a portion of the north porch and the entire south porch of the cathedral. Alluding to this section of the magnificent iconographic scheme under review, Didron remarks: "Maintenant que l'homme est créé; qu'il sait travailler et se conduire; que d'une main il prend le travail pour appui, et de l'autre la vertu pour guide, il peut aller sans crainte de s'égarer, il peut vivre et faire son histoire: il arrivera au but à point nommé. Il va donc reprendre sa carrière de la création au jugement dernier, comme le soleil sa course d'orient en occident. Le reste de la statuaire sera donc destiné à représenter l'histoire du monde depuis Eve et Adam, que nous avons laissés filant et bêchant hors du paradis, jus qu'à la fin des siècles. En effet, le sculpteur inspiré a prévu, les prophètes et l'Apocalypse en main, ce qui adviendrait de l'humanité bien après

que lui, pauvre homme, n'existerait plus. Il ne fallait pas moins que les quatorze cent quatre-vingt-huit statues qui nous restent encore pour figurer cette histoire qui comprend tant de siècles, tant d'événements et tant d'hommes. C'est la quatrième et dernière division; elle occupe le trois baies du portail du nord; le porche entière et les trois baies du portail méridional.

"Cette statuaire est donc bien, dans toute l'ampleur du mot, l'image ou le miroir de l'univers, comme on disait au moyen âge. C'est un poème entier où se reflète l'image de la nature brute et organisée dans le premier chant; celle de la science dans le second; de la morale, dans le troisième; de l'homme dans la quatrième; et dans le tout, enfin, du monde entier. Tel est la charpente intellectuelle de cette encyclopédie du pierre, tel est son plan et son unité morale."

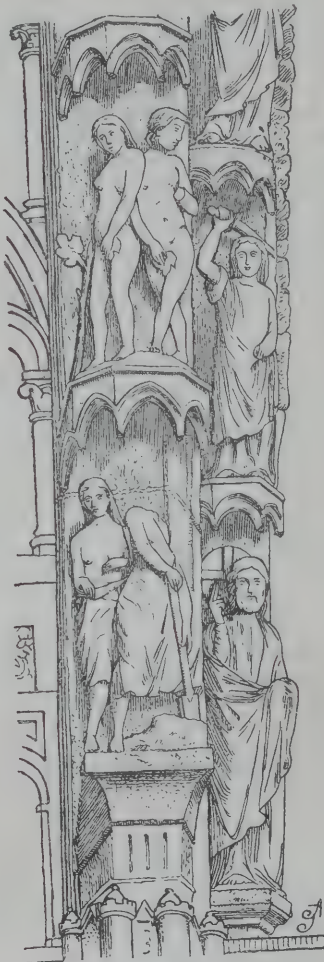


FIG. 1.

The superb north porch of Chartres Cathedral may be accepted, so far as the historical aspect of its sculptures is concerned, as illustrative of the history of the world up to and inclusive of the birth of Christ, to comprise the history of the chosen people of God, terminating with the life and death of the Virgin Mary. This porch, notwithstanding its intimate connection with the Old Testament and the old world generally, is dedicated to the Virgin, who was held in the highest honour and the deepest veneration during the Middle Ages. It was the usual practice in those centuries which were most remarkable for the erection and rich embellishment of great churches, to consecrate north porches and portals to the Blessed Virgin. Several reasons have been given for this practice, but these may be left for future consideration. The north has not, however, been specially selected in either the magnificent cathedral of Reims or Notre Dame, at Paris. It is true, that in the smallest and least-ornamented portal in

the north transept of Reims, there is an indication of this practice in so much that a statue of the Virgin and Child occupies a prominent position in the tympanum; and that in the portal of the north transept of Notre Dame—a statue of the Virgin, also carrying the infant Saviour, is placed against the *trumeau* or central pier; but in both these vast edifices the chief portals dedicated to the Blessed Virgin are in their western façades. In the cathedral of Reims the central and largest of the three superb western portals is devoted to her honour. Here her statue, crowned, and with the Child on her left arm, stands against the *trumeau*, whilst a fine composition—the Coronation of the Virgin—fills the entire space of the gable over the arch. In Notre Dame the northern of the three western portals is dedicated to the Virgin. Here, again, her statue occupies the position of honour, whilst above, in the tympanum, are fine alto-reliefs of three prophets, three kings, the Entombment, and the Coronation of the Virgin. Speaking of this portal, Viollet-le-Duc justly remarks: "La Porte de la Vierge de la façade occidentale de Notre Dame de Paris est certainement une des premières compositions en ce genre. Supérieure aux œuvres analogues du XIII<sup>e</sup> siècle, elle atteint du premier coup l'apogée de l'art. Si l'on étudie cette porte en dehors des influences qui prétendent classer tous les ouvrages du moyen âge au-dessous de ceux de l'antiquité, on reconnaît bientôt que jamais l'alliance de l'architecture et de statuaire n'a été plus intime." This portal contains nine large figures in the jambs and central piers, twenty-eight figures in the alto-reliefs of the tympanum, sixty-two figures arranged in the four members of the arch, and forty-two small basso-reliefs. The arrangement and iconography of this interesting doorway will be fully described when we come to the iconography of the Life of the Virgin.

Returning to our hasty consideration of the iconography of Chartres Cathedral, we have to point out that, whilst the Old Testament history occupies the north or left hand (as we look towards the east), the New Testament history occupies the south porch, and is accordingly on the right hand. This is the accepted relation throughout the entire range of Christian symbolical art. When Christ is represented enthroned or "in glory," and the emblems or symbols of the old and new dispensations appear in the composition, the Tables of the Law are placed on His left hand and the Book of the Gospels on His right. In Christian Symbolism the right hand is always held to be the more honourable position than the left. Thus, when the Synagogue and the Church are personified by two female figures bearing different attributes, that symbolising the Law should be on the left, and that symbolising the Gospel on the right, of whatever may be the central figure or composition.

Enough has, perhaps, been said, by way of an introduction, to direct the student's mind to the chief sources whence the Mediæval artists, in western Christendom, derived their inspiration, and received a clear guidance towards a systematic iconography. Chartres Cathedral has furnished us with an admirable field in its external sculptures alone, for the comparisons we have endeavoured to draw between the written books of the Middle Ages and those books in stone which owe their existence to the chisel of the sculptor. Whilst the former were accessible and intelligible only to the few and learned, the latter were written in characters all could understand, and their pages were ever open in summer and winter, in sunshine and storm. We have as yet spoken of the external sculptures alone, but shall have again and again to speak of the other series which are presented by this remarkable building.



has been computed that the figures represented in the sculptures and stained glass of Chartres Cathedral amount to nine thousand, and all these, singly or in groups, are arranged in a natural and chronological system as perfect as it is remarkable.

Although the idea of this system, as has already been pointed out, appears to be directly derived from the great encyclopedic writings, it is quite possible, and indeed, probable, that it had an earlier origin in Byzantine art. That Christian Iconography and Symbolism had assumed a definite and settled system in eastern Christendom long before they had reached any important development in the west is beyond dispute: and there are ample proofs in the pages of certain illuminated manuscripts, executed in western scriptoria, that the Byzantine methods of depicting sacred personages and subjects were known to the early artists of the Latin Church. Western sculptors and painters, however, were never trammelled by hard and fast rules, defined by ecclesiastical authority, and handed down from century to century, as was, and still is, the case in the Greek Church: and although they acknowledged the guidance, and accepted, as a groundwork, the order and general classification of the great encyclopedic writers of their times, the western artists were free to use their imagination, and to exercise their inventive powers unrestrained. To this fact is due the greater interest which pervades the works of the sculptors and glass painters of the cathedrals of Chartres, Reims, Amiens, Paris, and Bourges, and of innumerable churches in France and England, in comparison to the interest one experiences in examining different works of Greek or Byzantine iconography.

Although none of our cathedrals or churches were ever enriched with sculpture to the extent usual in French buildings, there can be no doubt that they were freely decorated with mural paintings. The Venerable Bede, in his "Life of St. Benedict Biscop," informs us that that worthy, first Abbot of Wearmouth, ornamented the walls of his church with edifying paintings of Gospel subjects. These were doubtless the portable pictures he is stated to have procured in Italy. From his time (the closing years of the 7th century) the practice of adorning churches with sacred subjects in painting, and, as time went on, in stained glass also, was probably never relaxed during the Middle Ages in this country. Few remains of either the paintings or stained-glass windows are spared to us now; but what has been handed down to us has proved of the greatest interest to the student of Christian Iconography and Symbolism. There is little doubt that our artists of the 12th and two following centuries received much of their inspiration from the French, who always possessed the most advanced school of Christian Iconography in the west.

In these brief remarks we have confined ourselves to the period in which Christian Iconography reached its highest and most systematic development as a religious instructor and as the handmaid of Christian architecture: we have thought it unnecessary, in such introductory remarks, to refer to the early and symbolical paintings of the Roman catacombs; because, interesting though they may be, they exerted but little influence on the art of the Middle Ages, beyond supplying it with certain symbolical figures and forms, which were derived from earlier sources, and were simply copied by the inexperienced painters of the catacombs. We shall have to allude to these figures and forms during the progress of our treatise. Beyond the sources of inspiration we have mentioned, there were several others studied by the artists of the twelfth, thirteenth, and fourteenth centuries; and these will be spoken of in their proper place, and when

they have to be directly referred to in connection with subjects under consideration. We may pass them over for the present, and proceed to our brief introductory survey of the system of Christian Iconography as met with in Byzantine or Greek art.

(To be continued.)

#### MISTAKES IN ARCHITECTURE.

"WE are all of us wrong sometimes," was the opening remark of an introductory lecture by Professor T. Roger Smith, F.R.I.B.A., delivered last (Thursday) evening at the commencement of the new session of the classes of Architecture, Construction, and Practice at University College, London. The lecturer added that he had selected his topic, Architectural Mistakes, on the ground that to be forewarned should signify to be forearmed, and from the hope that possibly some of his hearers would be able hereafter to steer clear of a few errors as a consequence of their having been pointed out that evening. He proposed to consider his subject from two standpoints: first, students' mistakes; and secondly, those of architects. Under the former category the foremost to be considered was the mistake of neglecting opportunities, an error occasionally committed from wilfulness or idleness, but more often made out of mere thoughtlessness, and failure to grasp the situation. Every chance of taking part in what an architect or his assistant had to do in actual practice was an opportunity—even copying a letter, making a tracing, or entering a message in a call-book, was a lesson if the pupil chose to learn from it; much more valuable were the chances of seeing work and materials. Mistake number two was that of losing heart and giving up. There came to most young men a time when the novelty of their change of occupation and position had worn off, and the irksomeness of routine was being felt, with possibly the depression due to being in lonely lodgings, instead of at a bright home or the sixth form of a busy school, and the wish to give up was awakened. Fortunately, in most cases, this was practically impossible, and the student felt obliged to stick to his work, got over his difficulties, regained heart, and went on. But time and tone were often lost in the struggle, and it was a thing to fight against. To begin business life by losing a year or two, and starting afresh with the consciousness of a failure behind one, was, to say the least of it, unfortunate. Occasionally a student turned up, however, of whom one was obliged in honesty to say that the greatest mistake of his life was adopting the architectural profession. If a man was thoroughly unfit for a calling on which he had entered, by temperament, training, and habits, and he and his friends became honestly and deliberately aware that this was so, the only wise thing to do was to stop. But for one person who had really made such a mistake, there were probably a score who, for a time, fancied they had done so; therefore, it was far safer to urge a student to resist giving up than to suggest it as a good thing to do. It was not, however, only the pupil who was apt to lose heart. There was a good deal of discouraging and difficult business to be got through by many young men in the interval between their articles and their start in practice, and again in the early days of practice. In all these difficulties the young man should not allow himself to be cast down. Constancy to a career was a matter to a very great extent under a man's own control, and the man who succeeded was the one who resolved stoutly that, be the rebuffs or disappointments or perplexities never so trying, he would not allow them to master him, and who carried out that resolve. The young man, Professor Smith continued, perhaps fresh up from the country, who goes round to the offices of one architect after another, and who answers every advertisement in the papers in the hope of getting employment, is on a very trying quest. But he is doing what most of us have had to do before him, and he is engaged in a way which has procured for many a man the opportunity of earning his daily bread, and for some has proved the first step in a career that has led to brilliant success. One of the most distinguished

professional men of the day began his London career, when an unknown foreigner in our city, by answering the advertisement of a leading architect who wanted a young man to trace in his office. This humble post he took, and filled sturdily till it was found how well he could do very much better work; and now his name is on every one's tongue. The proverb to take up when seeking for employment is, "Leave no stone unturned." To the more advanced man, who is feeling that it is very hard to get on, I may offer the suggestion once made to me by a very successful man when I was complaining that I found it difficult to get on, "Do not forget that the difficulties are your security." Granted the fitness for professional work, even in so crowded a profession as ours, and so enormously difficult a place as London, success may fairly be expected to reward each man who can go on bravely struggling for a sufficiently long time and who will not lose heart. Once more, it is a mistake to lose heart if any particular attainment seems to elude you. Say you decide to draw the figure, and you find it very difficult, or you decide to draw perspective, and you find it very perplexing. The thing to do is not to give up, but to go on; and if the difficulty takes twice the time and twice the trouble which it appears to have cost some comrade, the acquisition is more than twice as advantageous to you, and indeed more than twice as necessary for you as for him, so that your double trouble and double time have been well bestowed. It is a mistake, if you have the opportunity of choosing what work you will do—an opportunity which to some extent a pupil often enjoys, though an assistant seldom—to stick too close to one thing. Try to get a share in each sort of work that is in the office, and if it is work that you are not used to, and find it difficult to perform, so much the more instructive is it likely to prove. It is also a mistake to shirk the work you do not fancy. A young friend complained to me once that he was given a good many letters to write when he thought he ought to be drawing. I pointed out to him that when he was in practice he would have shoals of letters to write, and that he ought not to object to have the opportunity given him of practising his hand upon what is as necessary a piece of attainment as draughtsmanship. It is a mistake to take up too much that is outside your profession. Every young man ought to have some athletic pursuit, and some hobby or pursuit that is not exactly architectural is good, and in moderation desirable. But learning a profession is an arduous task, and the men who will succeed best are those who give up night after night to pursuits akin to architecture, such as a school of art, the Architectural Association classes and meetings, or working up privately book after book on construction, materials, &c., or practising design, or drawing, or working at the joiner's bench. It is a mistake not to sketch. Going and looking at architectural buildings is certainly better than not seeing them, but not of much permanent value. Photographs, whether you buy them, or what is worse (because it takes up so much time), make them, are almost worthless as substitutes for the results of your own sketching and measuring. What you draw you look at—you to some extent, understand, and you generally remember, while the drawing will always remind you of what you saw and tried to fix on your paper. Holidays are the best opportunities of architectural studies possible, and as soon as the first difficulty of sketching architecture from buildings is got over, sketching tours are the most enjoyable holidays possible. More can be learned in a fortnight's well-directed sketching than in months of work over books and drawings. It is a mistake to sketch or to study alone, if it can be avoided. Though a man's books and drawings are not bad companions, human friends are more useful, if of the right sort. The best comrade for a beginner is one who is more advanced than himself, and, fortunately, the tyro, if teachable, is far from being the worst companion for the advanced student. On the choice of subjects of study I have not much to point out; but it is a mistake to despise surveying. Many students consider that they ought to prepare themselves for purely architectural practice, and for that only, and that everything which can go by the name of surveying is unnecessary, if not be-



neath them. They believe surveying to be wide of their line, and that it is to be accordingly shunned; but when they come to practice, they will find that a certain amount of surveying work will come in their way, and must either be done or handed over to better-prepared persons. I am not now speaking of quantities, the preparation of which is a distinct work, but of all that relates to the examination and care of existing buildings. In any city or town, for one new building there are hundreds already in existence, and each of these hundreds is likely to be repeatedly surveyed, now for repair, now for alteration or enlargement, now for sale or purchase or rating and possibly again after injury by fire, so that the mass of surveying work in the aggregate is considerable. Much of this can be better done by an architect than by any other person, and from time to time every architect is asked to make surveys under circumstances which make it clear that, if he cannot or will not, valuable connections will go elsewhere. So do not consider that surveys are nuisances or interruptions, but pick up what you can about them, and, if a chance offers, try to see a little land surveying. A very few days in the field will make the methods of working clear to anyone who has not forgotten his trigonometry. There is a mistake of an opposite character sometimes made—that of neglecting design. Designing is the highest part of an architect's work, and it is work that he must be able to do. It is of no use for a beginner to try to design. He has no materials yet, and it would probably be more likely to do him harm than good if he attempted to originate out of the emptiness of his knowledge something that should represent a building. But designing does not come of itself, and yet many students go on for years accumulating knowledge and experience, and make no attempt to exercise themselves in design. Whenever one has made a piece of architecture one's own by studying, sketching, and measuring it, the wise course is to try to design a variation upon it, making use of the same features, details, and ornaments, but rearranging. This may be done, if you like, upon a single feature and an extremely small subject. The last mistake with regard to study that I name is that of not going on the Continent. This is a great mistake, and if you say that it is a serious expense and absorbs much time—which are the two things that can be said against a Continental tour—the answer is that, as to time, it cannot be better spent, and as to money, there are few liberal professions where some expense is not absolutely necessary at some time, while the scholarships and studentships obtainable give to a few students in each year substantial assistance. Certain it is that this period of continuous study in other countries and under other suns seems more than anything else to make the difference between the mere draughtsman and the accomplished architect. Every professional student has now to look forward, more or less, to examinations. We have examinations and competitions for prizes enough to bring mistakes in examinations well within our scope this evening. The prime mistake is to go up unprepared, in the hope that one may succeed by a fluke; or in the mistaken belief that one knows the subject so well that no preparation is needed. I have had a rather long and wide experience as an examiner in architecture, and the degree of unpreparedness with which some candidates are content is perfectly astonishing. In the case of the Institute examination for Associateship, or that for the district surveyorship certificate, long and careful preparation is needed, and for each of these a spice of practical training is wanted. Where the drawings have to be made with a view to prizes offered by the Institute, the Association, or the professional papers, a candidate, in order to have any chance, and to gain any good from entering on the competition, ought to have some experience of drawing, and, if the prize be for a design, some notion of designing before he ventures to compete; though, as these are competitions and not pass examinations, failure to succeed does not involve the same discredit, and ought not to have the same discouraging effect on the candidate as failure in a pass examination. It is a mistake, let me very emphatically say, for any student attending the courses about to begin here to avoid the final examination or

any intermediate examination. The prizes are only few, and as far as they are concerned the examination at the end of the session is competitive; but certificates are given to as many as get more than a certain proportion of marks without limit of number, and so there is for each one a chance of having his ability and diligence recognised. In the examination room it is a great mistake to fire off a piece of knowledge that has nothing to do with the question, simply because you know it. No examiner who knows his work will give a single mark for statements that are irrelevant and do not answer any part of the question, and time is wasted in these useless displays that could have been spent in earning marks. Next to the mistake of luging in irrelevant matter comes that of giving too much time to one or two questions. A paper in which there is no proportion among the answers is one very difficult to mark, but is sure not to get so many marks as one containing the same amount of writing and sketches, but where more questions are taken, and a clear, condensed, yet correct answer given to each. It is a mistake, also, in architectural examinations not to illustrate the paper of answers by sketches whenever possible. It is, again, a mistake to suppose that examiners in our professional examinations are anxious to trip you up. The object of the examiners is to bring out what you know and what you do not know, and they would rather be convinced that you are fit to pass than that you must be turned back. But they will not pass you till they are so convinced. If a question involves a difficulty, the answer which evades that difficulty is very differently considered from that which attempts it, even if it should fail to solve it perfectly. Passing on to consider, in the second place, architects' mistakes, before dealing with errors in practice the lecturer referred to some of those frequently made in designing, pointing out that one of the worst was to attempt to design without being familiar with the forms, features, and ornaments of the style in which the practitioner was working, and with the manner in which those elements had been put together by successful architects before his time. Professor Smith continued: A new style is a mistake; not that a new style is in itself impossible, but that it is impossible to you or me. It is idle to suppose that the genius of any one man could successfully work out a new style that his fellow-men would feel to be appropriate. Looking round on the motley variety of styles which prevail in modern Europe, we are tempted to believe that it is a matter of no moment what style be brought in and used. Yet a little observation will show you that it is not so. No architectural style is practised in England, various as the styles that are or have been in vogue may be, unless its roots are deep and wide in the history or the sympathies of the English people. We have no reasonable ground for supposing that a new style could live and thrive, even if a great man had the genius to devise such a thing. If it comes it will grow, not be made. Every apparent novelty in architecture should be viewed with distrust, as more likely to be a mistake than a success. That novelty is both possible and desirable is self-evident, but beware of what seems to promise to be extremely and strikingly novel. It has probably been tried before and given up as less good than the received way, or, if that be not the case, there is great risk of its being the blemish instead of the blossom of your work. The one defect of importance in St. Paul's Cathedral occurs at the crossing of the main avenue and the transepts—the one part where its great architect has departed most widely from the practice of other church builders, and has, in the search for novelty, sacrificed more than he has gained, clever though the disposition of the piers that carry his dome undoubtedly is. In practice, no mistake so grievous can be made as that of taking bribes. An architect who accepts illicit commissions, or does nominal work for large fees, or who allows any other of the expedients by which receiving a bribe is made to look as if it were a business transaction to be practised upon him, has sinned against the very first duty of a professional man; he has sold his independence, and has put himself under the thumb of the very persons whom he ought to control. There are sure to be times when very specious proposals will be

made to most of you, and when it may appear almost quixotic to decline money which you sorely need; but whenever any case occurs in which you honestly doubt whether the transaction is one for you to agree to or not, I will suggest a practical test. Imagine yourself cross-questioned as to the entire affair by some such master of the art as Sir Henry James, before Mr. Justice Hawkins and a jury in open court, and if you at all doubt whether you would come off with credit, pray take that as an indication that the doubt is well founded, and the proposed transaction should be declined with thanks. Anything that is in any way unfair is a mistake as well as reprehensible. It is wrong; it is also bad policy. It is both dishonest and a mistake to get work away from a professional brother, or to undersell the profession by working at a rate below the recognised and fair rate, and it is equally a mistake to overcharge a client. Either of these will bring retribution in its wake. It is, generally speaking, a mistake to work for nothing. You may occasionally do it in the case of charities in which you are interested; but a guiding rule should be not to do it in any case except where the work is so in your own connection that under any circumstances it would come to you. To do work for nothing, and thereby deprive some other architect both of the work and the fees, is extremely bad. There remains no worse mistake to note than temper. Above all things an angry letter is a mistake. Make it a rule never to write a line while you are angry; for, somehow, an angry man's pen seems dipped in permanent gall rather than ink, and his written words unluckily have not the same chance of being either promptly answered, and then forgotten, or good-naturedly overlooked, that hasty-spoken words often have. A letter written in heat is read in cool blood. If something raises your wrath, and you sit down and fire off a withering epistle, the best thing you can do is to put it in the fire there and then; the next best, to keep it twenty-four hours, and then reconsider it; and the next best, to show it to a judicious friend. At the same time, just anger is not the same thing as giving way to temper. The ability to exhibit indignation at the right moment, if kept perfectly under control, is very useful to one who has to supervise works or direct men. The just anger of a superior is generally dreaded, and to an extent far beyond what one would expect or can quite explain. We are liable to make mistakes by writing where we ought to speak, and speaking where we ought to write. Writing is far more fit than our fading memories to record anything that should last. It is quite inelastic, quite unyielding; so it is unfit for anything of the nature of give-and-take. In all negotiations, explanations—above all, whenever there is a difficulty or ground for dissatisfaction—see people, at all sacrifices, in preference to writing them. At such times it is a mistake to write. On the other hand, if any specific order has to be given, if any definite objection or complaint has to be made, or if any agreement has to remain in force for any length of time, it is equally a mistake not to put it in writing. Your order, your complaint, your contract may often be originally done by word of mouth; but, in such cases, they should be afterwards repeated in writing, for accuracy's sake. In architectural practice delay is a mistake. At the first inception of an undertaking, whether the client be eager or the reverse, it is equally prudent to do something at once. The eager client is balked if he find nothing done after a short time, perhaps changes his mind as to doing the work at all, or, more possibly, changes his architect. The lukewarm and indifferent client, who might by a promptly-prepared sketch have been encouraged to go on, is disheartened, or turns to something else, or postpones or abandons his intention. Carelessness, again, is a mistake. As Goethe says, "Genius is the art of taking pains." This definition covers half, and more than half, of the truth, and it would be perfectly true if you altered the wording and said, "The secret of success is the art of taking pains." Read any good life of any prominent public man (as, for example, read Mr. Street's life lately published), and you will see what incessant, eager toil and watchfulness occupied every hour of his day, and his night too. It is, however, possible to throw one's self into the interesting part of a pursuit, and to remain



indifferent to unattractive or insignificant details. This is likely to lead to trouble. In the conduct of works, then, it is a mistake to neglect small matters, though it is equally a mistake to fuss. In every building there occur a certain number of apparently little points which must receive the architect's careful attention, but which one is naturally more inclined to leave to others or to chance than the questions that affect large parts of the fabric. The difference between the important and the unimportant does not, however, lie in their magnitude, or their cost, or their conspicuousness. In a house the main walls are a costly part of the building, but they may be considerably damaged, decayed, or mutilated without a tithe of the inconvenience to the inmates which will occur if their chimneys smoke, their taps yield nothing but lukewarm water, their ovens will not heat, or the water runs off from their cisterns. The same thing is often true of the artistic effect of your work. There is, however, an opposite: Fussiness is a mistake. It is fussiness to visit a building too constantly or to interfere for the sake of interfering. If as architect you have the power of making alterations, every alteration, even if it be an improvement, means delay and expense, and delay and expense are among the worst evils that can afflict a building. There are few improvements which are really worth the cost, delay, and annoyance that come of interfering with a contract which has once been settled and accepted. Generally speaking, variations are a mistake. Mistakes in dealing with your clients are especially to be guarded against, because they generally injure your prospects in life. Many, if not most, instances of miscarriage between clients and their architects appear, however, to start from one root—namely, from mistaking the duty you have to discharge, or forgetting to keep up the proper relation of architect and client. Your duty may be described thus: to form a correct idea of what your client wants and wishes, and to do your best to obtain it for him. Your relation to him is purely professional and not that of friendly intimacy, or equality, or good fellowship, or boon companionship. There are cases where an architect forms an idea of what a client wants, but which does not correspond to his wishes, and then there is sure to be dissatisfaction. There are cases where an architect forms a notion of what a client wishes, but fails, till too late, to realise that it is not what he wants. The result again is dissatisfaction. There are cases in which the architect troubles himself little about either the wants or the wishes of his client, and works out what in his judgment they ought to be. Same result. Lastly, it has sometimes happened that the architect and the client, or one of them, have forgotten to maintain their intercourse on the proper professional footing, and if any cause of disagreement arises these cases end in the bitterest of quarrels. Professor Cockerell—a prince of architects—used to say to us, "Be a gentleman among artists and an artist among gentlemen." In dealing with those employed on your works, it is a mistake to suppose that every contractor, tradesman, or artificer is a thief or an extortioner, and every quantity surveyor a kind of contraband agent. I have put it strongly, but the suspicious temper of mind at which this remark points goes sometimes far towards a tone of feeling as exaggerated as this. The fact is, your contractors and tradesmen are engaged in one of the most complicated and difficult businesses possible. Their motive for carrying on the business is to make a profit, and you should look upon it as a matter for sincere regret if a profit is not made by the contractors on your works. I do not, however, recommend that you should cease to be vigilant and careful. It would be quite as great a mistake to abandon watchfulness as to abandon confidence gratuitously, and it would be a departure from the line of conduct which your duty to your client prescribes to you. It is, perhaps, hardly necessary now to say anything about quantity surveyors, but when I began practice there was a kind of uneasy feeling that quantities were a kind of illicit trading, and those who prepared them akin to smugglers. Such notions are a mistake; the profession of a quantity surveyor is a most honourable and confidential one, and the work they do is now indispensable to the conduct of building opera-

tions of any magnitude or complexity, and the assistance they render to the architect very valuable. It is for a beginner a mistake to employ second-rate or unknown men, either as builders, manufacturers, or quantity surveyors. In conclusion, Professor Smith observed: To steer clear of every error is impossible, but good sense, right feeling, and thoughtful attention to your work will go far to preserve you from any very serious slips. Years ago a pupil of mine acted as clerk of works on a job of mine where there was a great deal of masonry. He noticed that some of the masons, as soon as they got a block of stone out of which to cut a feature of the building, set to with mallet and chisel, and in ten minutes were hard at it. Others would spend an hour or two, or possibly a whole morning, studying the block of stone on every side, considering exactly how best it could be utilised, and, in short, laying out their work before they put their hands to it. The men who made mistakes in their work were masons of the first group, not of the second. Perhaps this observation may suggest to us a method by which we may avoid mistakes in our work.

### PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XIII.

By HENRY LOVEGROVE, F.S.I., Surveyor.

DIMENSIONS (CONTINUED).

	ft. in.	ft. in.	
2	6 5	12 10	Fair raking, cutting to red brick facing, back gable.
2	96 4	16 0	3082 8
4	2 4	16 0	149 4
2 2 1/2	20 4	11 0	447 4
4 2	12 0	1 0	96 0
2	5 0	13 0	130 0
2	5 0	11 0	110 0
2 2	2 3	12 0	108 0
2	14 6	2 0	58 0
2 2 1/2	5 0	2 6	25 0
2 2	2 3	2 6	22 6
2			Extra labour forming pilasters 4 1/2 in. wide, 2 1/2 in. projection, and 9 ft. 9 in. in red brick facing.
2			Extra to cut rubbed, swelled frieze in red brick, 6 in. by 2 1/2 in.
4	17 6	70 0	Extra to red brick, moulded string, one course high, as necking.
4	4	20	Ml. external.
1	4		Do. internal.
4	17 6	70 0	Pd. ct. wthg. narrow to necking.
5	4		External ml. = 20.
2	4		Internal ml.
2			Red brick carved moulded corbels, 12 in. by 9 in. by 9 in. at end of pilasters.
2 4	7 6	60 0	Fair raking cutting to red brick facing.
4	8 3	1 0	33 0
4 2	4 9	9	28 6
4	17 3	9	51 9
4	12 1	1 0	48 4
4	20 4	9	61 0
2	38 4	9	57 6
2	38 4	1 0	76 8
2	9 6	1 0	19 0
2	9 6	9	14 3
2	103 3	4 10	998 1
2	40 6	4 10	391 6
2	103 3	9	154 11
2	40 6	9	60 9
4	2 3	1 9	39 5
1 2	4 0	1 9	28 0
4	3 0	4 0	120 0
1 2	4 9	4 0	76 0

2	28 0	50 0	Deduct extra red-brick facing for band back and front.
2	28 0	42 0	
2 2	4 0	28 0	Deduct do. for terracotta under windows back and front.
2 2	1 9	14 0	
2 2	2 0	76 0	Half-brick extra thickness under windows as before.
2 2	2 9	44 0	
2	16 0	128 0	Half-brick do. for plinth to w.c.'s.
2	16 0	24 0	Deduct extra red-brick facing for plinth capping.
2	48 8	73 0	Deduct extra to red-brick facing band at level of window-sill.
5	3 0	11 3	Add.
2	41 0	20 6	Half-brick extra for moulding under cove.
2	41 0	82 0	Extra to red-brick moulded string under cove one course high.
2	1	2	Splayed ends.
2	1	2	S.E.
2	41 0	184 6	Portland cement cove on lath including deal bracketing.
2	1	2	S.E. to do.
2	1	2	Splayed S.E.
2	41 0	82 0	Deal moulding out of 4 in. by 8 in. and fixing on ends of rafters to form a part cornice and
2	1	2	S.E.
2	1	2	Splayed do.
DAMP-COURSE.			
	377 4		
4	1 2	440 3	Damp-course as described.
4	14 0		
2	9	42 0	Add.
2	18 0		
6	9 0	27 0	Add.
6	5 10		
2	1 2	40 10	Add.
2	43 6		
2	9	65 3	Add.
2	28 0		
2	9	42 0	Add.
2	3 0		
2	9	4 6	Add.
2	5 0		
2 3	9	7 6	Add.
2	1 6	13 6	Add.
2	1 6	2 3	Add.
2	103 3		
2	43	77 6	Add.
2	40 6		
4 2	43	30 5	Add.
4	3 0		
4	4 0	9 0	Add.
4	4 1/2	6 0	
2 2	4 9	7 2	Add.
2 2	4 1/2	4 2	
FIREPLACES.			
6			Flue C. and P.
5 1	2 6		
6	3 3	89 5	1 1/2 brick deduct.
6	2 6		
6	3 3	48 9	Deduct extra to glazed brick facing.
6	2 6		
6	4 1/2	5 8	Extra to flat brick arch in glazed bricks.
6	2 8		
6	9	12 0	
6	2 6	15 0	Turning piece 4 1/2 in. soffit.
6	4 0	24 0	2 in. by 8 in. wrought iron chimney bar, with ends split and turned up and down.
6 2	1 0		
6 2	2 0	24 0	Extra to glazed brick facing to sides of opening.
6 2	1 8	20 0	Raking, cutting, and waste.
6 1			Dr. Teale's grate to 2 ft. 6 in. opening and setting complete.
6 1			Bath stone shelf 12 in. by 3 in., cut and pinned into wall, with moulded front edge and returns to form chimney piece, including cut glazed brick facing and m.g. do.
6 2			Stone brackets under ends of shelf out of 4 in. by 9 in. by 6 in. moulded and carved on front, cut and pinned into wall, including cutting glazed brick facing, and m.g. do.
6	2 6		
5	1 2	32 1	Glazed tile hearth and bedding and jointing in cement.
6	4 0		
5	1 6	66 0	
11 1			Glazed stoneware fenders to hearth with 2 ft. 6 in. opening for fireplace and fixing.
5	4 0		
5	1 8	33 4	Half-brick trimmer in cement and centring.
5	4 0	20 0	F.E.S.



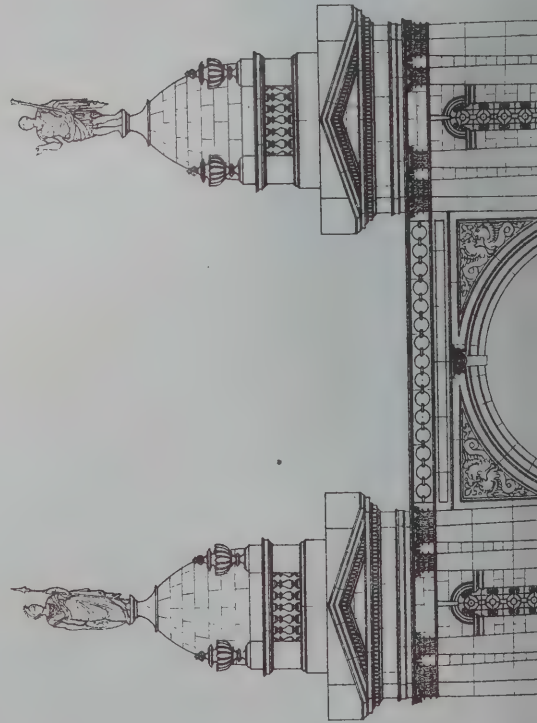
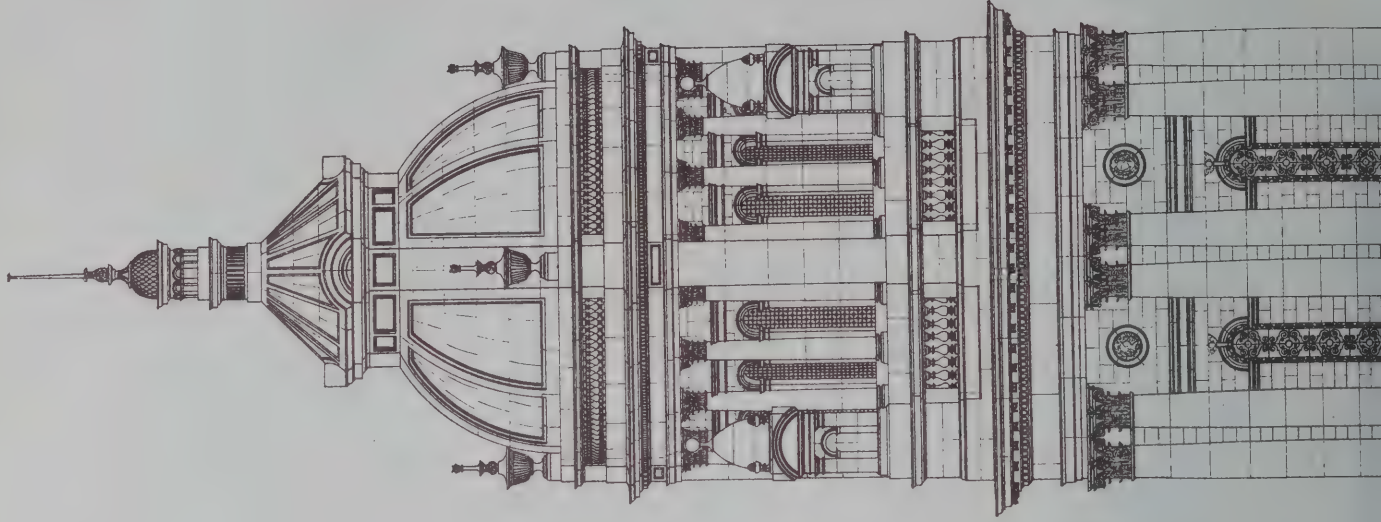
ft. in.		ft. in.		ft. in.		ft. in.		ft. in.		ft. in.		ft. in.		ft. in.	
5	2 6	40 8	Deduct Portland cement rendering trowelled smooth for paint and	2	2 0	32 0	Extra glazed brick facing to stairs.	4	2	17 0	51b. lead step flashing to wings.				
5	2 6	12 6	Deduct bold flush bead in Portland cement at top of dado and	2	13 0	39 0	3 0	4	2	17 0	136 0 R.W.P. do.				
5	2 6	12 6	Deduct extra to flush bead in Portland cement as skirting.	2	13 0	30 0	3 0	4	2	8 0	64 0 Deduct do. and add groove in terracotta burning in lead flashing.				
5	4 0	20 0	W.I. chimney bar as before.	2	10 0	30 0	Deduct for door.	10	2	6 0	51b. lead flashing to sides of dormers.				
5 1			Rounded relieving arch in Portland cement over chimney bow.	2	14 0	210 0	Extra to glazed facing to stairs.	10	2	1 0	120 0				
5 1			Cast-iron chimneypiece with register grate and setting to 2ft. 6in. opening and	2	28 6	57 0	Extra to cutting and fitting glazed brick facing to steps and risers.	10	2	4 3	180 8 51b. lead cheeks to dormers.				
2	108 0		Extra to glazed brick facing set and pointed in cement to form dado of approved tints and manufacture, the lower part to a height of 9in. forming skirting of different tint to the upper.	2			3 0	10	2	4 3	85 0 Close copper nailing.				
2 2	1 2	26 10		2			9	10	2	3		Soldered dots and screws.			
2 6	5 9	69 0	Extra to glazed brick circular to angle of rooms 1ft. 2in. girth,	2			3 0	6	2	6 0	120 0	Open copper nailing.			
2 2	5 9	23 0	Extra to rounded angle bricks to chimney breast.	4	2	2 3	40 6	6	2	3 6	63 0	51b. lead cheeks to lower part of dormer.			
	110 4		Extra to glazed brick moulded capping to dado, 3in. high, and projecting set in cement and pointed.	4	2	2 3	18 0	6	2	3 0	36 0	Close copper nailing.			
Em.			Pieces circular capping in circular angles, 14in. girth.	2	2	2 3	18 0	6	4	5 3	141 9	Soldered dots and screws.			
5	2 0		Deduct extra to glazed brick facing for wws.	2	2	2 3	18 0	6	4	4 6	141 9	61b. lead covering to flat under dormers.			
5	1 9	49 0		4	2	2 3	18 0	6	2	5 3	31 6	Extra 1r. dressing lead over tiles and edge of flat.			
9 2	1 9	49 0	Extra to glazed brick rounded angle as before.	2	2	2 3	18 0	6	2	3 0	36 0	Open copper nailing.			
5	2 0	28 0	Deduct extra to glazed brick moulded capping.	2	2	2 3	18 0	4		5 0	20 0	Deal narrow gutter board and bars to chimneys.			
5			M. to do. = 28.	2	2	2 3	18 0	4		7 0		61b. lead gutter.			
9 2			S.R. = 28.	2	2	2 3	18 0	4		2 0		51b. lead over flashing.			
5			Cutting and waste to glazed	2	2	2 3	18 0	4		5 6		R.W.P.			
5			brick facing to wws.	2	2	2 3	18 0	4	2	6	11 0	51b. lead step flashing to chimney.			
5			Deduct extra to glazed brick facing as before.	2	2	2 3	18 0	4	2	5 6	22 0	30 R.W.P.			
10 2	1 9	78 9		2	2	2 3	18 0	4	2	3 10	30 8	51b. lead apron.			
10 2	1 9	42 0	Extra to glazed brick angle,	4	2	2 3	18 0	4		1 0	24 0	R.W.P.			
10 2	3 9	45 0	Deduct extra to glazed brick capping.	2	2	2 3	18 0	2		6 0		1in. deal gutter board and bars next wings.			
2				2	2	2 3	18 0	2	1	1 6	6 0	2in. deal round roll.			
2				2	2	2 3	18 0	2	2	1 6	6 0	2in. deal ribbed drip.			
2				2	2	2 3	18 0	2	2	1 6	6 0	Raking cutting to lin. ends of gutter.			
2				2	2	2 3	18 0	2	2	1 6	6 0				
2				2	2	2 3	18 0	2	2	1 6	6 0				
2				2	2	2 3	18 0	2	2	1 6	6 0				
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2				2	2	2 3	18 0	2	2	1 6	6 0				
2				2	2										



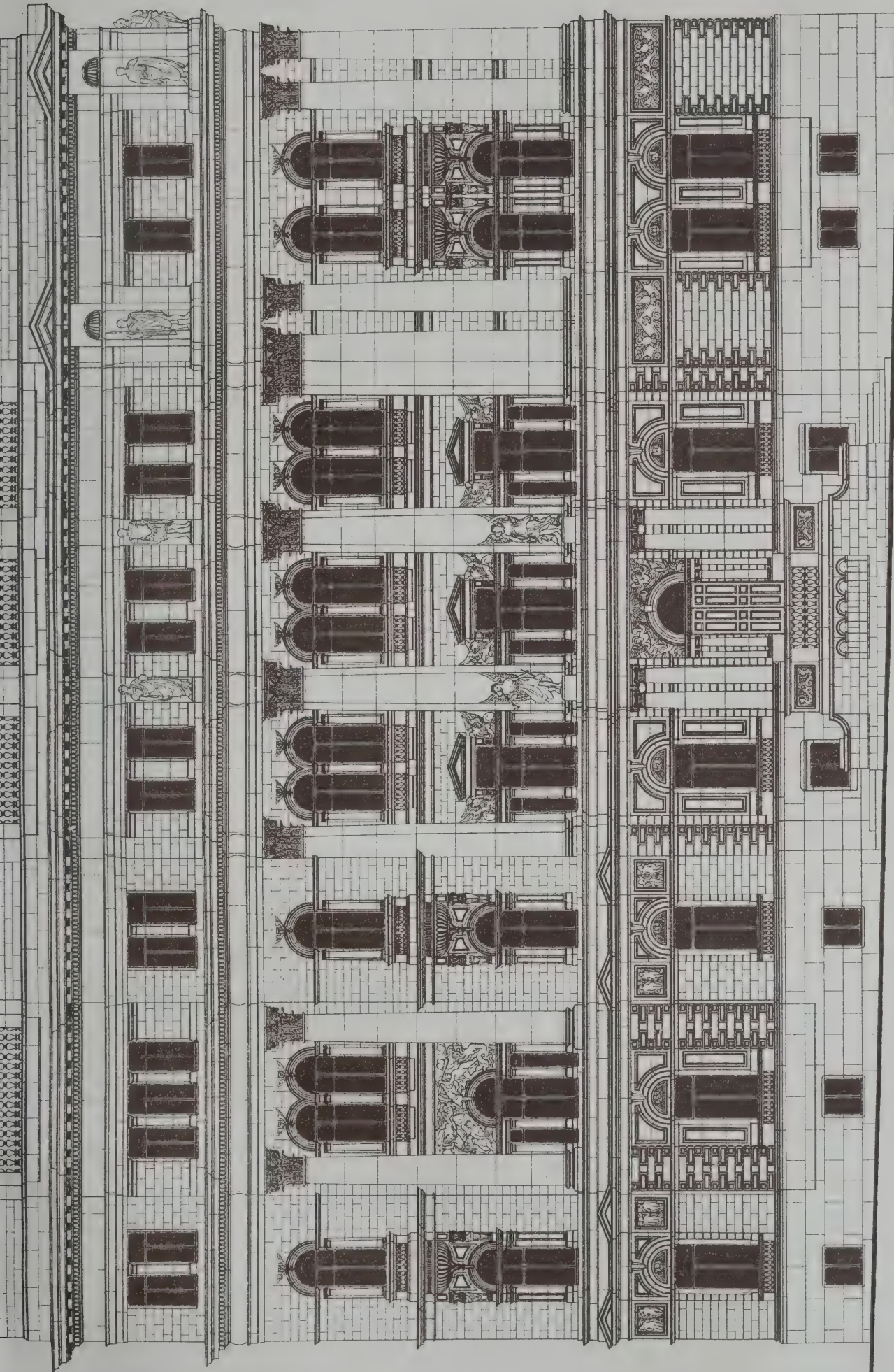




THE NEW  
ADMIRALTY  
AND  
WAR OFFICE







PORTION OF ELEVATION TO ST. JAMES'S PARK — S.W. ANGLE

MESS<sup>RS</sup> LEEMING & LEEMING, ARCHITECTS.





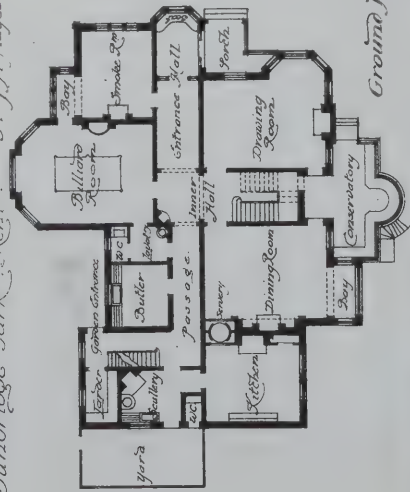




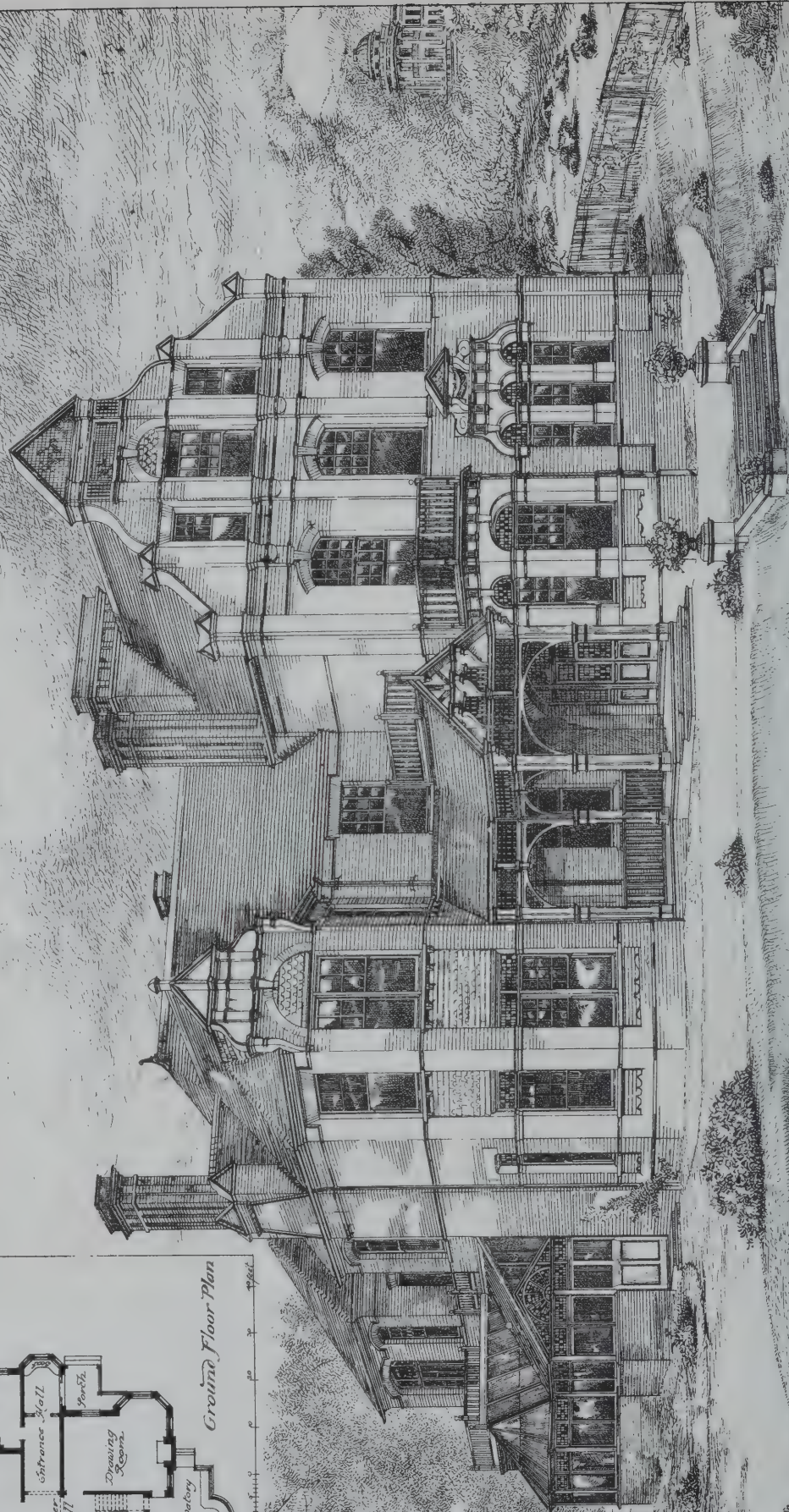


DETACHED RESIDENCE

Standonhoe Park, Kent. Mr. J. H. Hayes Architect.



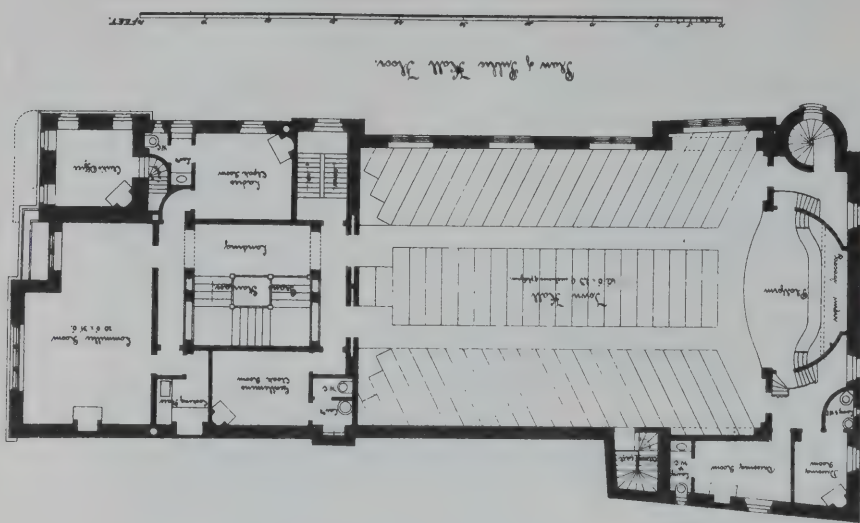
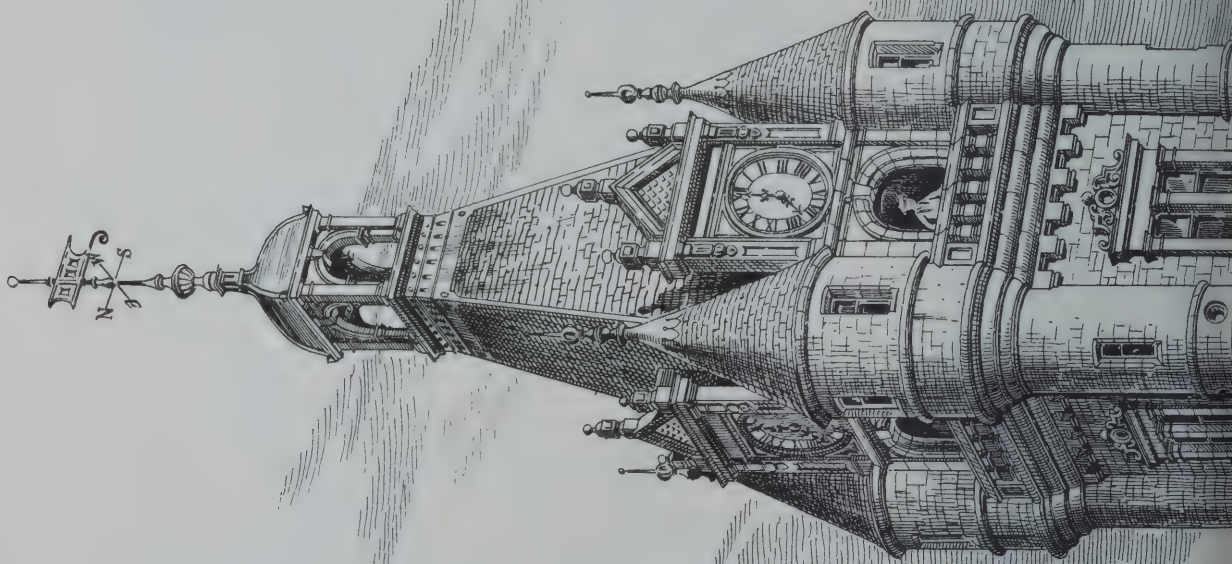
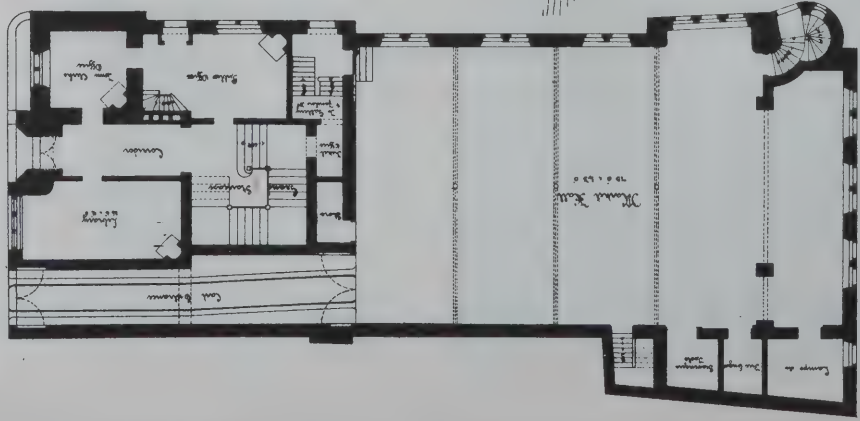
Ground Floor Plan











Shaw & Smith Hall Moor.





LOCKPORT TOWN HALL N.B. F.J.C. CARRUTHERS Architect

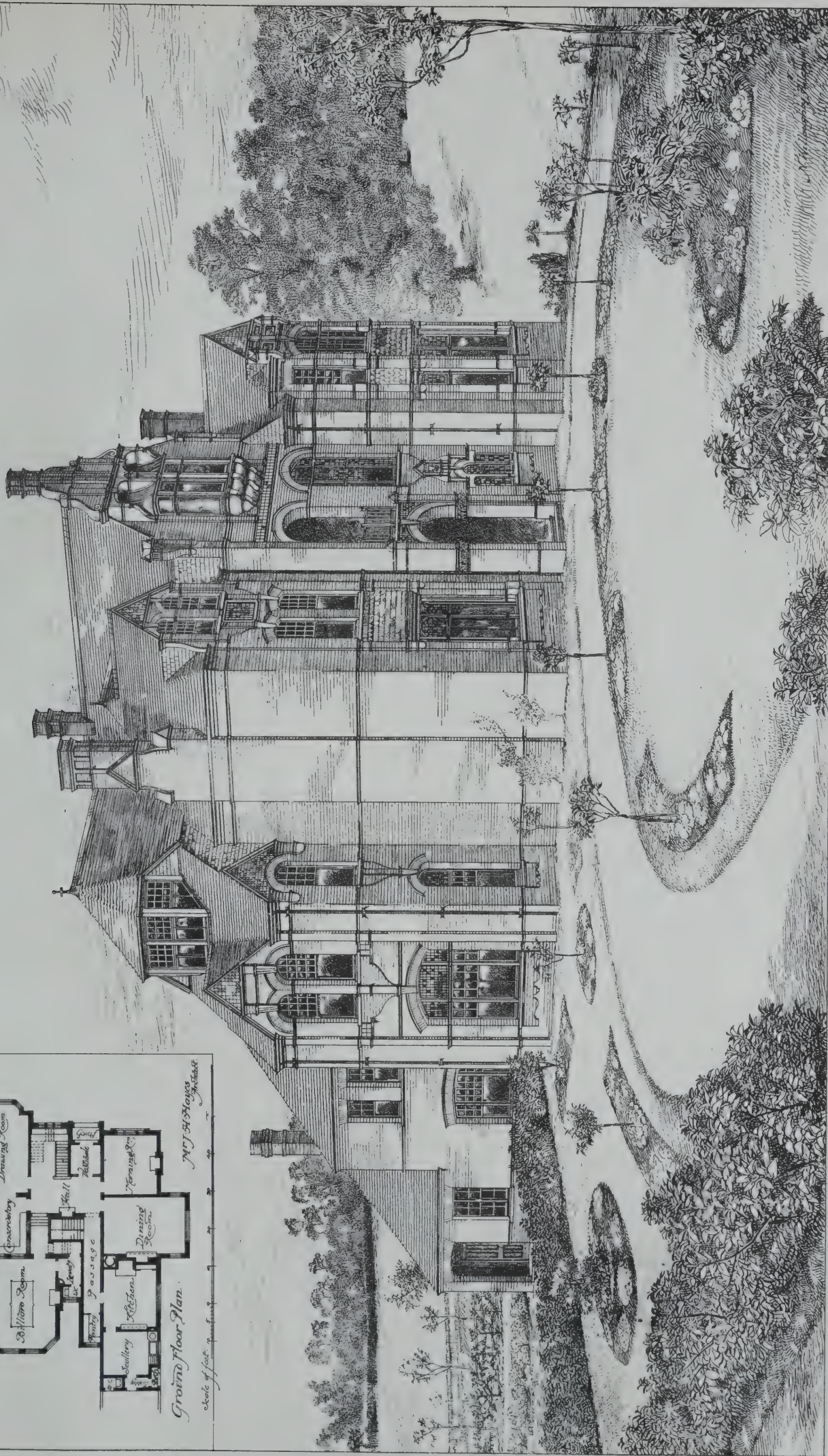
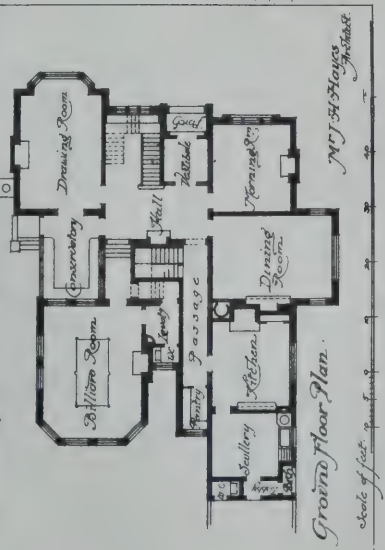
Photo Lithographed & Printed by James Akerman, 6 Queen Square, W.C.







THE MAULFELD RESIDENCE.  
Swinage Park, Kent.













THE BUILDING NEWS, OCT. 5, 1888.







"Photo-Tint" by James Akerman, 6, Queen Square, London, W.C.

THE PRESENTATION IN THE TEMPLE. SOUTH AISLE WINDOW. HELMSORE CH. MANCHESTER.

DESIGNED & EXECUTED BY ALFRED OCTAVIUS HEMMING.







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## ILLUSTRATIONS.

LOCKERBIE TOWN HALL.—THE "PRESENTATION IN THE TEMPLE,"—THE NEW ADMIRALTY AND WAR OFFICE.—RESIDENCES, SUNDRIDGE PARK ESTATE.—PRACTICAL ARCHITECTURE, WITH DETAILED ESTIMATES: AN ISOLATION HOSPITAL.

## OUR LITHOGRAPHIC ILLUSTRATIONS

NEW TOWN HALL BUILDINGS, LOCKERBIE, DUMFRIESSHIRE, N.B.

THE contracts for this building have been let, and the work is being rapidly pushed forward in the expectation of having the whole works completed by January, 1890. The building will be entirely of red sandstone from Messrs. Benson's quarries at Corncockle, the roofs covered with green slates from Keswick, and the timber finishings of public hall and committee rooms will be of selected pitch-pine. The cost of the buildings, including the price of site, amounts to a little over £6,000, which has been raised by public subscription in the district. The contractors are as follows: Masons' work, Mr. Wm. Lawson, Lockerbie; carpenter's and joiner's work, Mr. Wm. Douglas, Lockerbie; plaster work, Mr. John Laidlaw, Lockerbie; slater's work, Mr. Thomas McKinnon, Lockerbie; plumber's work, Messrs. P. Drummond and Son, Lockerbie; ironwork, Messrs. P. and W. McLellan, Glasgow; cement work, Mr. Oswald Lister, Ilkley. The buildings are being erected from designs and under the personal direction of Mr. Frank J. C. Carruthers, of Dixons, who is the architect.

STAINED-GLASS WINDOW, HELMSHORE CHURCH, NEAR MANCHESTER.

OUR illustration shows the subject portion of a south aisle window recently designed and executed by Mr. A. O. Hemming, of 47, Margaret-street, Cavendish-square, W. The colouring throughout is rich, but subdued in tone, and is carefully worked out in every detail. In the chancel of the same church are two large mahogany panels, 9ft. by 5ft., painted in oils on gold backgrounds, the subjects being "St. Peter Denying Our Lord" and "The Unbelief of St. Thomas," by the same artist.

NEW ADMIRALTY AND WAR OFFICES.

THIS double-page plate, from the architects' detail drawing, gives a portion of the elevation facing St. James's Park at the S.W. angle of the buildings, as proposed by the first amended design after Messrs. Leeming and Leeming were elected architects for the work. We published in the BUILDING NEWS for April 6th, 13th, and 20th last a series of drawings illustrating the final scheme, giving views and plans of the proposed block of offices.

HOUSES, SUNDRIDGE AVENUE, BROMLEY, KENT.

THESE houses are situated upon a portion of the wooded and undulating estate of the late Sir Edward Scott, Bart., now being rapidly developed by the trustees. They are built of red bricks with Bath stone dressings, and the roofs are covered with Broseley tiles. The builders of one design are Messrs. Ashfold and Co., of West Kensington. The accompanying plan shows the arrangement of the ground floor; the upper floors contain ten bedrooms, dressing-rooms, bath, box, and cistern rooms. The builder of the other design is Mr. J. Hall,

of Crouch-end. The annexed plan shows the accommodation on the ground floor; the upper floors contain eight bedrooms, dressing-rooms, bath, box, and cistern rooms. The architect is Mr. J. H. Hayes, Baron's-court, West Kensington, W.

## EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

THIS Society's annual exhibition, which opened to the public on Monday last, is well worthy of a visit, while to the architect there are many things in the gallery which cannot fail to be attractive. Among these is a series of photographs by Mr. Horace W. Gridley, illustrative of Palmyra, the ill-fated city of the desert founded by Solomon, and known as the Tadmor of the Bible. These prints are the first photographs of Palmyra brought under European notice, the difficulty of penetrating into the desert with the camera necessarily being very great. Among the other architectural studies is a series from Ripon and Chester Cathedrals, with some fine pictures from Moreton Hall by Mr. E. Openshaw. Mr. Bracebridge Hilditch, of Richmond, sends a set of clear bromide prints of St. Mark's, Venice, beautifully executed, and these are supplemented by others of a similar character from the same city by Mr. J. J. Ackworth. Mr. T. S. Schwabe, of Manchester, shows two or three large photographs of the Alhambra, and Messrs. Robinson and Thompson exhibit a large number of small architectural studies of Dutch buildings and waterways of Holland. The Beauchamp Chapel, St. Mary's, Warwick, has been chosen for a good example of Messrs. Morgan and Kidd's photographic skill, and we mention also with pleasure Mr. J. B. Best's autotype view of Kirkstall Abbey. The ball room at Haddon is seen to advantage in Mr. H. Forsyth's print, No. 262, and the following frame of a view in the grounds below that mansion by Mr. E. Openshaw, showing the river and the ancient bridge leading to the Hall, is a masterpiece of detail. "In the Castle Garth, Newcastle," by Mr. Lyddell Sawyer, pleases us greatly, and the small view at Thun, a platinotype by Mr. S. H. Brewerton, we also noted. The library, Beau Manor, Leicestershire, is illustrated by a good negative by Mr. H. Bedford Lemere, who lately has done some good work at Haddon. Mr. J. Gale is as good and refined as ever in his work, which, for an amateur, certainly is unsurpassed. Buckingham Palace is shown by some views by Messrs. J. Russell and Sons; but the architecture is unworthy of such delicate representation. The same firm exhibit some good studies from Carlisle Cathedral, &c., which please us better. The platinotype by Mr. T. M. Brownrigg, "At a Cottage Door, Surrey," is a first-rate, well-balanced composition; and three yacht pictures, by Mr. Arthur Debenham, are masterpieces of instantaneous photography. Stratford-on-Avon Church, by Mr. C. H. Bothamley, and Wollaston Hall, Notts, by Mr. S. Bourne, deserve mention. Space alone prevents our noticing many others of equal interest. The exhibition is a good one.

## Z-IRON COLUMNS.

SOME interesting deductions from experiments are detailed in a recent number of the *Transactions* of the American Society of Civil Engineers respecting Z-iron columns. The author, Mr. C. L. Stroebel, C.E., who prepared plans for the superstructure of the new bridge of the Chicago, Milwaukee, and St. Paul Railway over the Mississippi river at Kansas City, found great advantage in using a form of compression member consisting of four Z-irons joined by lattice bars in the middle. The combination or cross-section so made represents a letter H, except that the upper and lower ends of the letter are turned outwards. The same section can be made by two channel irons joined by a lattice. Each of the four Z-irons is formed by joining two angle irons (L) so that the return ends are reversed. The rolling of the Z-iron was found not to be more difficult than rolling common angle iron, and the cost was ascertained to be much lower than that of channel iron, which could have been used for the purpose. Amongst the other advantages found to be secured by this section of compression member over that of the usual

kind formed by two channel bars latticed together were: economy of material in the lattice bars, economy of manufacture, as there are only two rows of rivets required instead of four; protected position of lattice bars, easier connection with other members. Experiments made on small columns of the same proportions as those in the structures proved very satisfactory. The tables given by the author show that the Z-iron pillars compare favourably with other sections. The ultimate strength of Hodgkinson's cylindrical tubes for lengths ranging from 40 to 90 radii (14 to 32 diameters) was 33,000lb. per square inch. The average for the Watertown tests of Phoenix columns for lengths ranging from 40 to 100 radii (14 to 39.5 diameters) was 35,800lb. per square inch. The average for latticed channel columns for lengths ranging from 59 to 90 radii (21 to 32 diameters) was 32,300lb. The tests on Z-iron columns show no variation in the ultimate strengths for columns of 64 radii (23 diameters) and 88 radii (31 diameters) long, the average being 35,650lb. per square inch. This favourable result is attributed to the fact that the metal in the outer periphery of the cross section is not weakened by rivet holes, but is solid and unbroken. The diameters referred to are those of an equivalent cylindrical tube whose area is concentrated on the circumference, and whose radius of gyration is the same as that of the section. The writer further says that, "considering all the tests which have been made on hollow columns with square ends, he believes that he is justified in assuming that their ultimate strength is constant for lengths up to 90 radii (32 diameters). This assumption is a convenience in the practical work of proportioning the parts of a bridge, because it saves the necessity of calculating the radius of gyration for the chords and end-posts." The following formula is given by the author for Z-iron columns. Ultimate strength in pounds per square inch =  $46,000 - 125 \frac{l}{r}$  for lengths exceeding 90 radii, and 35,000 for lengths equal or less than 90. The paper and graphical exposition of the formula, together with the plates, are deserving attention.

## CHIPS.

The Town Council of Preston considered on Friday a bill received from Mr. James Abernethy, M.Inst.C.E., for £866 15s. 9d. for professional services rendered in connection with the unfortunate Ribble Navigation and Docks Bill, and although some demur was made at the amount and the absence of particulars, it was decided to pay the amount asked for.

The new railway line from Wimbledon to Putney, which will supply direct communication with the West-end of London jointly by the London and South-Western and the Metropolitan District Companies, is now nearly completed, and is to be opened next month.

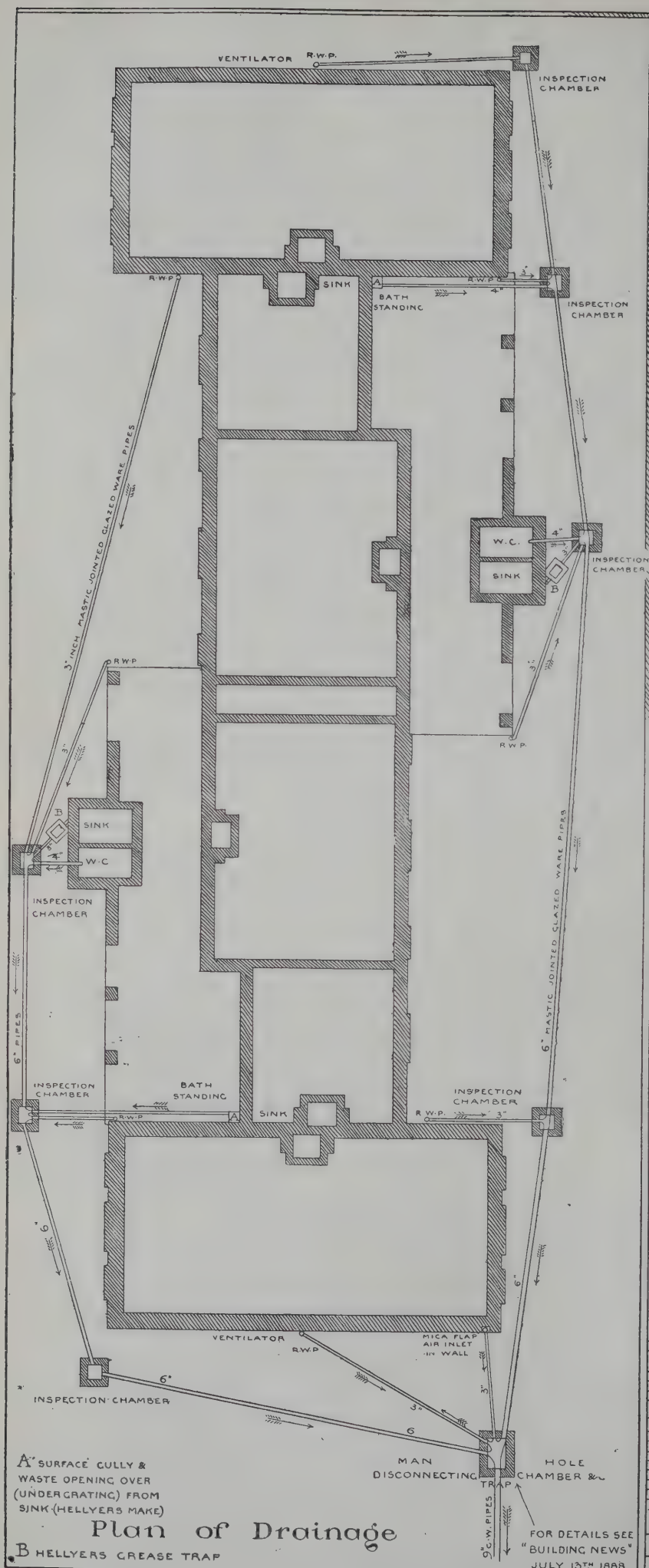
Mr. Codrington, C.E., held an inquiry at Bangor on Friday on behalf of the Local Government Board into the subject matter of an application to sanction a loan of £1,032 for works of street improvements. The borough surveyor (Mr. Gill) gave details of the estimates required for asphalt-ing the footpaths, the inspector remarking that the price allowed—16d. per square yard—seemed low. The surveyor explained that, as the town had its own gasworks, it would be able to utilise the tar made there, the disposal of which gave some trouble last year.

The Dean and Chapter of St. Paul's Cathedral, London, have secured the services of the Attorney-General in the St. Paul's reredos case; and his opinion is most favourable to them in upholding the bishop's veto, and further as to the legality of the whole structure, in view of the decision of the Privy Council in the Exeter case.

New police stations are about to be built for the county magistrates of Surrey at Farnham and Caterham, from designs of Mr. C. H. Howell, at an outlay of about £2,700 and £2,300. Messrs. Tompsett and Kingham, of Farnham, are the contractors for the station in that town, and Mr. Taylor for that at Caterham.

A curious fate has befallen the monument erected in Every-street burial-ground, Manchester, to the memory of "Orator" Hunt, the hero of Peterloo, and afterwards M.P. for Preston. It has been taken down and sold as old stone. The monument, which was in the form of an obelisk about 30ft. high, was erected in 1842. The foundation stone was laid by Feargus O'Connor, M.P., in the presence of about 15,000 people.





Scale of feet

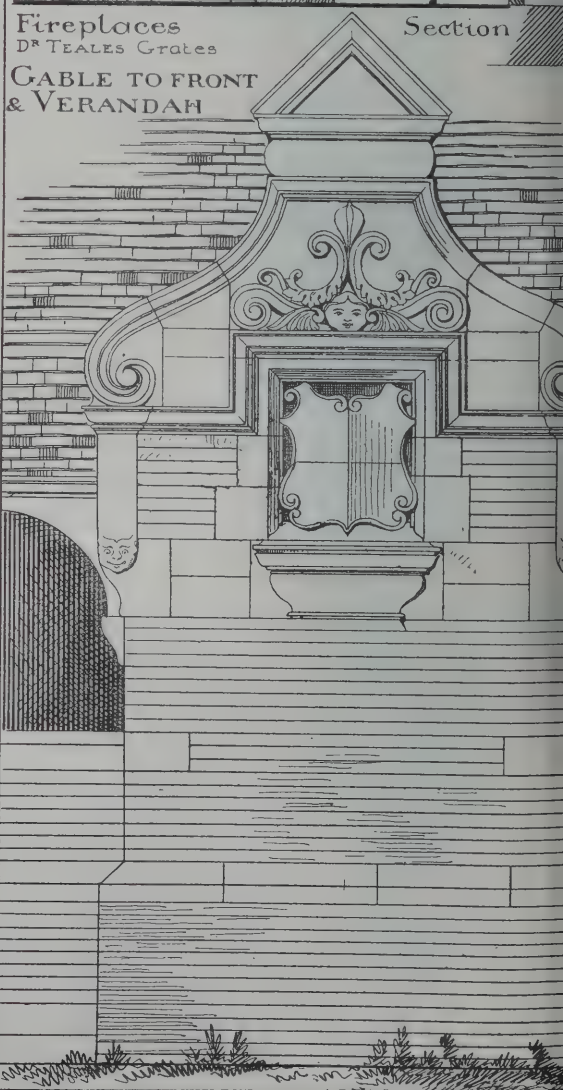
Dormers

Plaster

Fireplaces  
Dr Teales Grates

GABLE TO FRONT  
& VERANDAH

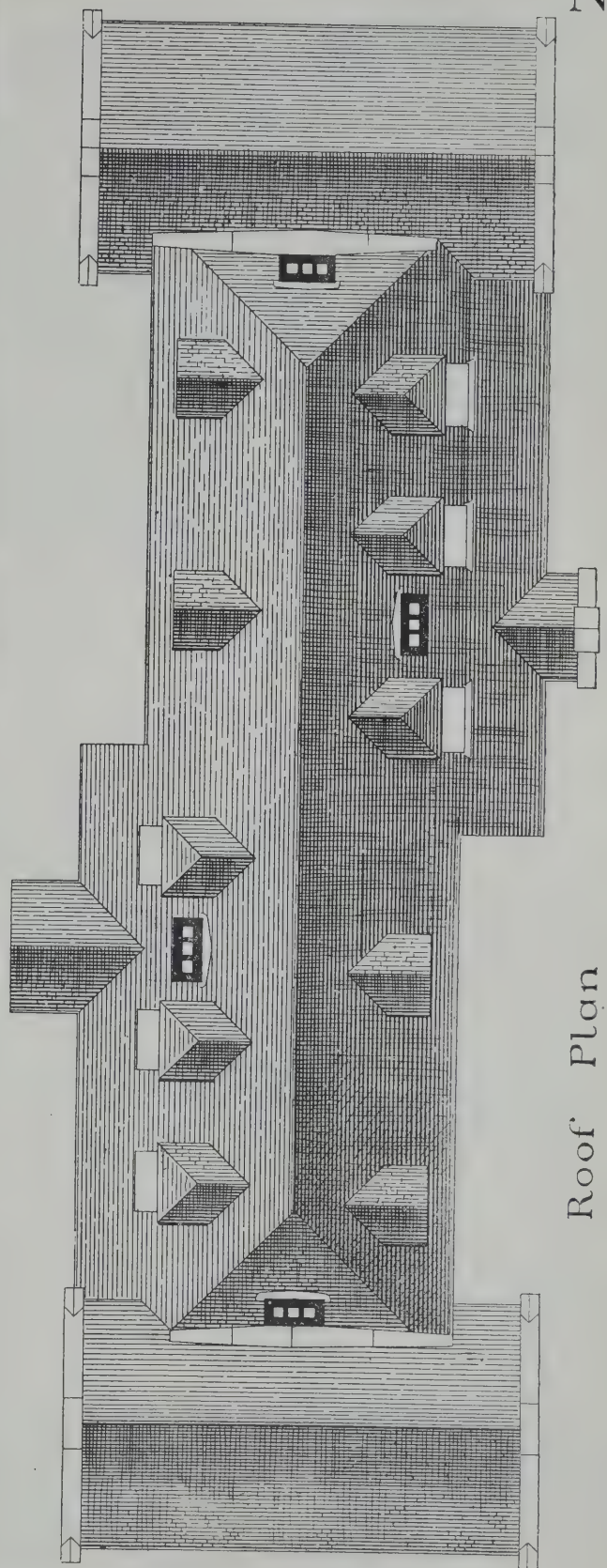
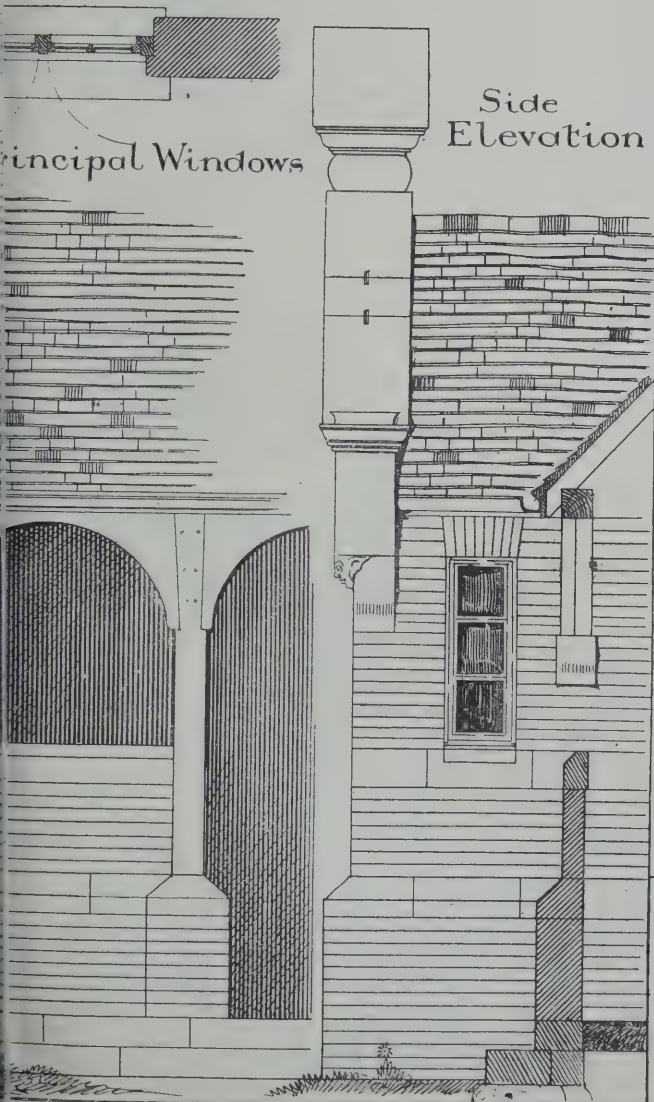
Section







Section of Dormers



Nº 7.

Roof Plan

Scale of feet  
10 5 0 10 20 30 40

PRACTICAL ARCHITECTURE  
WITH DETAILED ESTIMATES.  
**A COUNTRY ISOLATION  
HOSPITAL. DETAILS**  
MAURICE B. ADAMS F.R.I.B.A. ARCHT & DELT.



## WAYSIDE NOTES.

SIR CHRISTOPHER WREN did not anticipate the construction of a Thames tunnel near Fish-street-hill. Had he done so, it is possible that he would have provided a different kind of foundation for the Monument, one, perhaps, more after the style of the long leg to the north-east pier supporting the cupola of St. Paul's. Peradventure, he may have constructed something of this nature; on this point I have never inquired. Anyhow, whatever foundation was provided, we have grave reasons to fear that it has been interfered with by the operations in connection with the new subway. When I said last week that the construction of another Thames tunnel was wholly unobjectionable, I should have urged the objection that, in the immediate neighbourhood of large buildings, the necessary works may seriously endanger their stability. We know how much damage even the sinking of a well may do in this way. The sooner that measures are taken to prevent a disaster at Fish-street-hill, the better. We have had a warning, and it is fortunate that it was not attended by fatal results.

The escape of water from foundations is doubtless the cause of much that is mysterious in settlements and failures in building, and tunnelling is about the most fruitful source of this evil. A little ingenious burrowing in the neighbourhood of St. Paul's would work wonders on the appearance of that building, and frustrate the wish that Sir Christopher expressed when his assistants proposed to pile instead of constructing the stilt referred to. The drying-up of water in wells has at times disastrous results. In the dry season of 1884, in the autumn, I was called to inspect a farm-house in the Isle of Thanet that had cracked from footings to ridge in a most determined manner. On this occasion, the well, although 150ft. deep, had been absolutely without water for some weeks, if I remember rightly; and I have no doubt in my mind but that the dry season had caused the extraordinary settlement of a comparatively old house. What little water remained at the level of the bottom of the well had been drawn out, and a geological disturbance took place. Had I not heard that the well had dried up—a circumstance which, I believe had never occurred there before—I should have been at a loss for the cause of the settlement. Touching wells in the Isle of Thanet, there was some years back a well at Manston Court, with a large hollow wheel, for a donkey to run round its internal circumference, similar to that at Carisbrooke Castle, and the one at Mont St. Michael—the latter, however, worked by the prisoners. I believe that the wheel at Manston Court has been done away with.

Lord Grimthorpe has been on the job again. Last Saturday, glancing down the list of contents of the *Times*, I noticed there was something about the restoration of churches, with "Letter from Lord Grimthorpe" in large type, for all the world as if it were a matter of public importance. His lordship's epistle, after the usual preliminary abuse of architects in general, and F.F.R.I.B.A. in particular, dilated on the value of rough-tooling as against fair-faced work, in regard to the new stone-work put into "restorations." There is a place and time for everything—certainly for roughly-finished masonry, and there are times when this coarse workmanship has an utterly barbarous effect. Perfect finish in places is an attribute of every style, I believe Mr. Ruskin says in the "Seven Lamps." The earlier the style the more undesirable this finish, says Lord Grimthorpe. I have seen Early English work finished to perfection, sharp and clear to this day, and exquisite in its effect. Our amateur architect would give that softened effect to new work which we all like to behold in an old building, forgetting that good things are only to be acquired gradually, and that the loveliness of ancient masonry is only to be gained in the course of long ages with centuries of insensible decay. Time was, I take it, when all was spick and span. Probably, had Lord Grimthorpe erected more new and entire buildings, true finish would not be so distasteful to him; but, like William of Wykeham of old, his lordship's talent has been chiefly ex-

pended on restorations. Unlike William of Wykeham, however, Edmund of St. Alban's practice as a restorer has been but limited in extent.

The Architectural Association Conversazione will be held this evening at the Westminster Town Hall, and will be followed, in a fortnight, by the first ordinary meeting in Conduit-street, when the president will deliver his inaugural address. As soon as the Institute and Society begin to bestir themselves, the outlook over the architectural world will be a little more lively. I hope that the evening at Westminster will be very successful. The programme seems to foreshadow much that will be entertaining. It includes a reception by the President, Mr. Herbert D. Appleton, and a selection of music by a military band, announcement of prizes, and series of entertainments in the Council Chamber. The inner architectural man may be satisfied in the large hall.

The matter of the Blackwall Tunnel has been referred to the Works Committee of the Metropolitan Board of Works for consideration and report. They will report on Friday that the Board are proceeding with the work as quickly as possible, and that under the advice of Sir Joseph Bazalgette, their engineer, the tunnel for foot traffic will be constructed first, before the second and larger one for vehicular traffic is undertaken. This looks like business.

At the first meeting the Board held after the recess, the proposal of compiling and publishing a history of the Board's work, from its commencement to the present time, was discussed. One member—Mr. G. Hill—said that if the materials for such a history were collected and placed in the hands of an enterprising publisher, "an interesting book might be the outcome"—a declaration received with much mirth by the assembled members. A very interesting story might certainly be founded upon the dry facts elicited by Lord Herschell's Commission. But the Board is to disappear, and it is perhaps kinder to endeavour to appreciate the changes for the better which it has wrought in its existence of the span of one generation, rather than to dwell upon the shortcomings and corruption revealed in its last days. One certainly cannot overpraise the past deeds of the Board, viewed as one whole work, as, if vast undertakings have been accomplished, the expenditure of ratepayers' money has been still more stupendous. It would, however, possibly be a useful guide for the future to have a condensed history of the Board's work—an extract of the thirty odd bulky annual reports. Such a history would, at any rate, show how the metropolitan sewerage system has been evolved, and the drainage of the vast city, though anything from perfect now, has been infinitely improved. As Mr. Lawrence said at the meeting of the Board on last Friday, when the institution at Spring-gardens came into existence, the sewage of a great portion of London passed into the river near Waterloo Bridge, and the Thames, from which the water-supply of South London was drawn, was consequently poisonous. It is not, however, over-sweet even now.

A large hospital in connection with Owens College, Manchester, is proposed. The residuary legatees of Sir Joseph Whitworth have offered to find a suitable site for such an institution, and to contribute £35,000 towards the cost of the erection and furnishing of the first portion, besides providing an annual income of £1,000. From the munificent nature of this offer, I conclude that a building of a considerable size is contemplated.

Just as I thought! A down train running through Colchester has "struck the points." One point to myself, as I always said that there would be an accident at Colchester when I have held on to the seats of the G.E.R. express while jolting over the switches at that station and exclaimed, with the plumber who slid down the roof, "Now for a considerable bump!"

The Portsmouth Board of Guardians have erected a swimming-bath, holding 20,000 gallons of water, for the use of the pauper children, all of whom are to be taught to swim

before they leave school. This one instance where the demands of health and cleanliness are respected by authorities is refreshing; but it is like a rushlight in a barn—it makes the darkness of ignorance and neglect more apparent. The utter disregard of all measures for insuring the cleanliness of the poor is a foul blot on the Legislature, and a disgrace to the 19th century. This may be said, though, with regard to public baths generally. Taken in conjunction with the School Board system, it is especially deplorable. We spend millions upon the task of adorning the brains of children, who may be filthy in their bodies, though clean to the eye, and comparatively inoffensive to the untrained organ of smell. In regard to baths for the general public, we all know their vast importance; but what a miserable lack of such institutions is there in this country! Bills are promoted, and made law, that have for their object the care of the national mind; but little is attempted in the way of the preservation of the national body. Until more is accomplished in this direction—and especially for the benefit of the struggling poor—we have no right to talk of our advanced civilisation, as we are immeasurably inferior in the matter of public cleanliness to several peoples of antiquity, and to many Oriental nations of the present day. GOTH.

## CHIPS.

The chairman of the local board of Newton Heath, near Manchester, announced at their last meeting that a large number of competitive designs had been received for the erection of public baths, library, assembly rooms, and schools of science and art. Four of these designs will be selected to take part in the final competition, and the architect whose design is adopted will be awarded a premium of £50, and a like sum will be divided amongst the authors of the three unsuccessful designs.

The Aberdeen Royal Infirmary and Lunatic Asylum Corporation have just completed the purchase of the mansion-house of Glack, with 283 acres of land, for the purpose of forming a branch asylum to the institution in Aberdeen. The preparation of plans for carrying out structural alterations has been remitted to Messrs. Matthews and Mackenzie, architects.

Mr. Arnold Taylor, of the Local Government Board, held an inquiry at Burnley on Friday as to an application by the town council to borrow £5,500 for gasworks purposes, and £2,000 for providing new sludge presses at the sewage works. No opposition was offered.

The Hudson river tunnel, N.Y., is about to be completed by British capitalists and by the engineers of the Forth Bridge, Sir J. Fowler and Mr. B. Baker, and in a report on the subject the latter state that the work already done is substantial and well designed. They estimate that the work remaining to be done can be completed in about eighteen months, at an expense of £180,000 for the north tunnel and £250,000 for the south tunnel.

The new town hall at Brecon is approaching completion. The contractors are Messrs. Lewis and Co., of Hereford.

The Scruton chantry chapel attached to the R.C. church at Bradford has just been opened. It has been erected from the designs of Mr. Dunn, of the firm of Dunn, Hansom, and Dunn, and is in the Early Decorated style. It contains an effigy of the late Canon Scruton, lying on a tomb under a groined canopy, the work of Mr. Wall, of Cheltenham, who is also the sculptor of the alabaster screen surrounded by the rood shutting off the chapel from the north aisle of the church. A second screen in oak, separating the chapel from the chancel, has been executed by Messrs. Robson and Sons, of Newcastle-on-Tyne.

The Heriot-Watt College, Edinburgh, which has just been reconstructed and enlarged from plans prepared by Mr. Chessar, architect to the Trust, was opened on Monday. The additions take the form of two wings, each nearly as large as the original building. The outlay has been £27,000.

The spire of All Saints' Church, North-street, York, the upper part of which was blown down some few years since, is about to be restored from plans by Mr. Fowler, of Durham, at an estimated cost of £400.

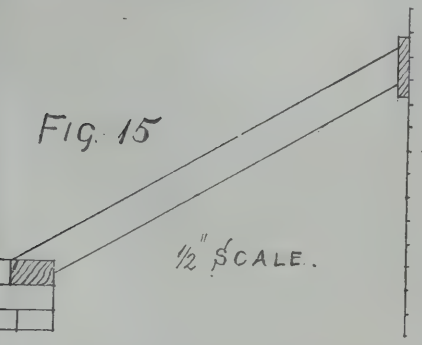
A new hospital for infectious diseases was opened by the Mayor of Newcastle at Walker-on-Tyne on Friday. It will accommodate 105 patients in five separate single-story pavilions, and is provided with the usual administrative block. Mr. W. G. Laws, the city engineer, designed and superintended the work of erection, which has been carried out by Mr. J. E. Middlemiss.



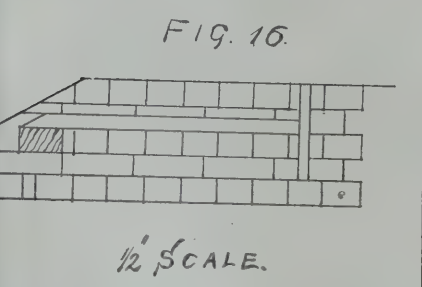
CARPENTRY AND JOINERY.—III.\*

ROOFING.

THE simplest form of roof in use is that of the shed roof. An example is given in sheet 3 of "Practical Architecture," BUILDING NEWS (July 27 last), in the roof over conservatory, which is a "lean-to" or shed roof. In that example in the "cross section" it is shown that the feet of the rafters rest upon, and are fastened to, a beam which forms part of the framework of the conservatory front, whilst

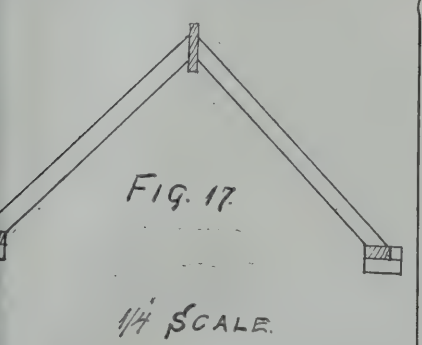


the top rests against a piece laid along the wall for the purpose. Now, sometimes, instead of the tops of the rafters in a shed roof being fastened against a piece serving as a ridge, the rids are inserted into the wall, holes having been left during the building of the wall, against which the roof is to lean, and in addition to the holes a wall-plate would be built in, which they could be nailed. The wall-plate, upon which the feet or the lower ends of the rafters rest, requires to be well tied in, as, of course, the tendency of the rafters is to thrust the plate away. This is done by means of wall-ties or pieces of bond timber, built in as shown in Fig. 16, and which are nailed to the

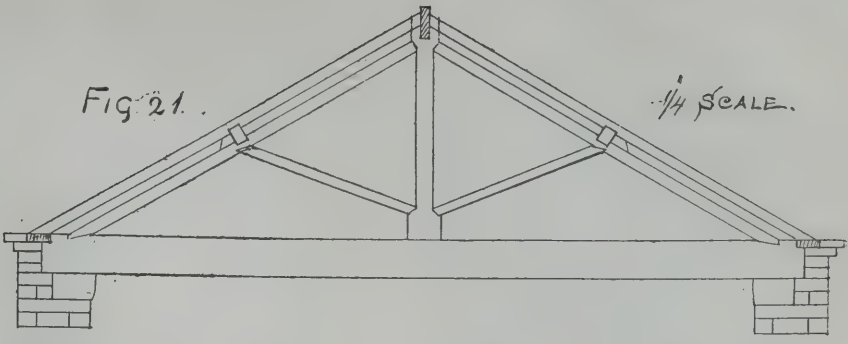


wall-plate. A piece is shown nailed against the end of the wall-tie. Now, it will be seen that all the building resting upon the wall-tie keeps the wall-plate from being thrust out, and the piece nailed to the end of the wall-tie is an additional help, as it takes advantage of the building below the wall-tie as far down as it reaches.

The next kind of roof is the A roof, and has ridge and rafters abutting against each other

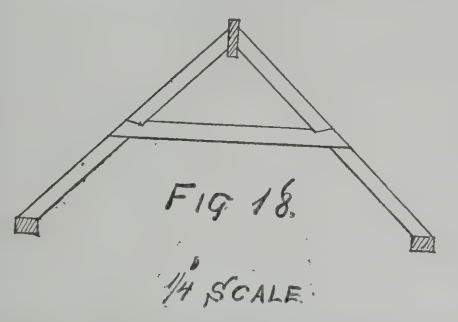


either side of it (see Fig. 17). This, in common with other kinds of roofs, is of many different pitches—that is, the inclination to horizontal line; there are the  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and  $\frac{1}{4}$  pitches, besides others. This indicates the length of the rafter. It is  $\frac{1}{4}$  pitch when the rafter in length is equal to  $\frac{1}{4}$  the width

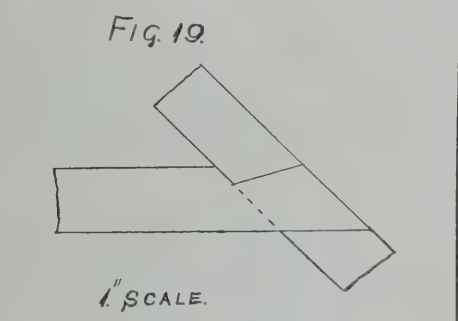


of the house, Gothic when the rafter in length is equal to the width of the house. (This idea is indicated in the paper on Centring, Fig. 12.) It may be here stated that the longer the rafter in any given width of house, the more downward thrust upon the walls, and the drier the roof; and the shorter the rafter, the more outward thrust upon the walls, and the more need to guard against a damp roof by giving more "cover" to the slates.

The carpenter, in getting out such a roof as this, lays down in the most convenient way and place the width from out to out of the wall-plates upon which his rafters are to be nailed at bottom, having a straight-edge or line to work to, corresponding with a level line



across wall-plates, finds the centre, squares up a line, measures the height of ridge or point where rafters are to meet at top on this line, and marks the size of the ridge, half its thickness being on each side of this line, and allowing for the ridge standing up 1  $\frac{1}{2}$  in. or 1  $\frac{1}{4}$  in. beyond the point of the rafter (a line being drawn along each side of the ridge as a guide to nail the rafters to when putting them up), cut two templates (by which to cut the

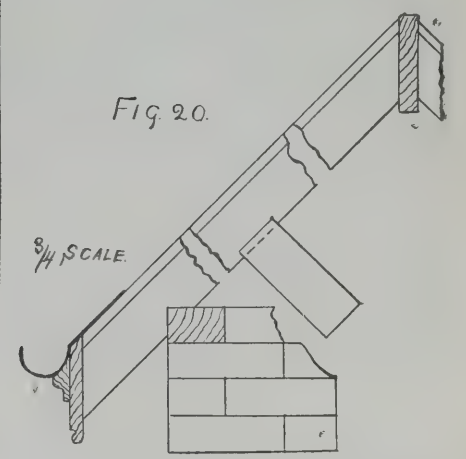


rafters) to fit exactly the wall-plate and ridge, and of the necessary length, as indicated in Fig. 17.

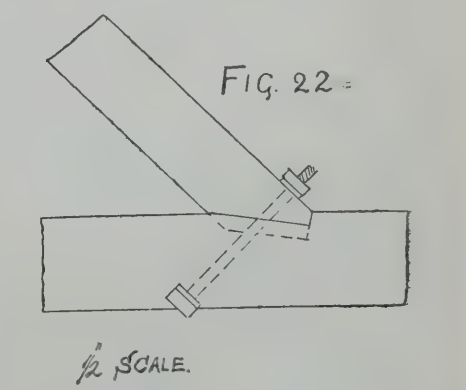
Sometimes roofs of this kind are strengthened by having a collar-tie or brace, as is shown in Fig. 18.

This would serve still more to strengthen each pair of rafters, and also the whole roof, if from where the collar-tie and rafter meet  $\frac{1}{2}$  in. were checked out of each, making thus a kind of scarf, and taking the half dovetail form shown in Fig. 19, the tie being, of course, nailed to the rafter. A frequently occurring case of this roof is shown in Fig. 20. The position of the wall-plate is slightly altered, and a check taken out of the underside of the rafter, as shown, to fit it, the rafter being side nailed to the wall-plate. The bottom end of the rafter is cut "plumb," and a "fascia" nailed against ends of rafters to which the spouting is

screwed, or sometimes the spouting is laid in hooks made for the purpose, and fastened to top edge of rafters by screws or nails, which hooks are placed at intervals to suit lengths of spouting, and hang down in front of fascia in such a way as that the eaves-



course of slates shall have its bottom edge just to the middle of the spout. If the rafter is short, there would be no intermediate support between wall-plate and ridge; but should the rafter be long, a purlin is placed centrally between the wall-plate and ridge. The purlin is inclined from the vertical, so that its top edge forms a solid support for the rafters. This is the almost universal plan. Sometimes, however, it is placed vertical, and its upper edge bevelled to suit the pitch of the roof, or the purlin is placed vertical (plumb), and "checked" out opposite each rafter to the inclination of the roof. Much might be said about these different methods; but the first method, as stated, is usually adopted. Should the space between two gables be too great (8ft.



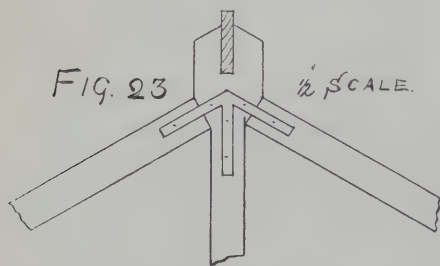
or 9ft. is enough), it is necessary to support ridge and purlins by a "principal" or "truss," which is framed of heavy timbers, mortised and tenoned together, and, in addition, bolted or fastened with ironwork specially made. The above figure shows a truss of this kind, which is termed a king-post truss, or, in some places, a principal. Trusses of this kind are used for very wide spans. The writer has prepared them up to 50ft. The method of laying down the lines for such a truss is, if there is a plank floor upon which the roof lines can be

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laid down, well; if not, a number of trestles of proper height (say 2ft. or 2ft. 3in.) are required. Place a number of these along so as to lay a plank or stout board on, of sufficient length to be equal to width from out to out of wall-plates, place another plank at right angles to this, and in the centre of its length (resting also on trestles); this plank must be long enough to allow height of roof to be laid down on it. Lay down lines as directed in explanation of Fig. 17, and cut a pair of guide rafter templates. Place these in position on the planks already spoken of, forming a kind of platform, and from these lay down the lines for roof-truss as is necessary. These vary in this way: sometimes the purlins are notched into principal rafters forming part of truss (as also common rafters are notched into purlins) 1in. or 1½in. or more; sometimes the purlins fit in between trusses, resting in "seats" prepared for them of wrought or cast iron. (Fig. 21 shows the purlins notched, and a piece nailed on principal rafter to keep the purlin from "canting.") When the lines have been laid down for truss, templates have to be made for its different parts, by which to "work" the timbers. The length for each piece is obtained from these, if not previously taken from scaled drawing. The parts forming truss are—Horizontal piece resting on wall is the "tie-beam"; centre piece at right angles the "king-post"; pieces to pitch of roof each side the "principal rafters"; and pieces from foot of king-post to centre of principal rafters the "struts."

The tie-beam is mortised at each end to receive feet of principal rafters (see Fig. 22). Dotted lines show depth of mortise. The tie-beam is also mortised in its centre to receive the tenon on the lower end of king-post. The king-post is mortised where the principal rafters abut against it to receive tenons on end of them (see Fig. 23), and again at bottom to

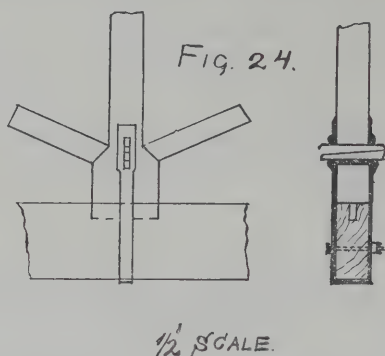


receive tenons of struts; the struts being tenoned into principal rafters at their upper ends. These mortises may be one-fourth the width of the timber—that is, with a tie-beam 6in. wide put in a 1½in. mortise. Instead of allowing the king-post to be of sufficient length to reach the tie-beam when the tie-beam is straight, it is shortened at bottom 1in. or 1½in., according to span, so that when the irons are on and the truss in position, the tie-beam is "cambered," which is, of course, done to allow for sinkage and to give it somewhat the property of the arch. Bolts and nuts with washers are sometimes used to fasten principal rafters to the tie-beam, and also the tie-beam to the king-post. The bolt fastening tie-beam and principal rafter together would be placed in the centre of the width at right angles to principal rafters, and otherwise its position is shown in Fig. 22. The nut at the bottom of king-post should be inserted at one side, and so that the bolt will just enter a few "threads" in order that it may have plenty of room to tighten, and thus take full advantage of the shortened king-post. This bolt should also be pointed, so as the more readily to enter the nut. The iron-work of trusses should be painted before being put on, so as to prevent rust.

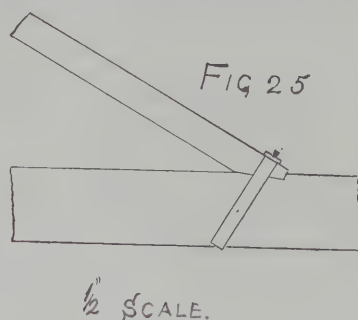
Be sure in framing up trusses that all joints fit properly, as otherwise, when the weight comes upon them they will be proportionately weaker and subject to yield in parts until each "shoulder" takes a solid bearing.

Where greater strength is required instead of bolts to connect principal rafters and king-post to tie-beam, "heel and stirrup" straps are used as shown in Figs. 24 and 25. In Fig. 24 iron wedges being the means used (gibbs and cotters) to tighten up king-post and tie-beam,

and in Fig. 25 the screw is the means used, the nut when screwed down tightening the plate down upon principal rafter. It may be here stated that the eaves-course of slates has to



have what is termed "bell-cast," that is, instead of having the angle of the roof it has a less angle, which is given by a tilting fillet or batten, which the slater would arrange, or sometimes the carpenter has to arrange for it, by keeping the rafters and wall-plate back from the front edge of the top course of brick



(or cornice); the difference in the inclination amounts to the thickness of a slating lath (about ½in.), and is for the purpose of keeping the "tail" of the slate hard down on the one beneath it, thus preventing in large measure the wind from getting underneath the slates.

#### CHIPS.

Messrs. Campbell, Smith, and Co. are intrusted with the whole of the decorations of the New Lyric Theatre.

According to Prof. Sargent, the strongest wood in the United States is that of the nutmeg hickory of the Arkansas region, and the weakest is the West Indian birch. The most elastic is the tamarack, the white or shellbark hickory standing far below it. The least elastic, and the lowest in specific gravity, is the wood of the *Ficus aurea*. The highest specific gravity, upon which in general depends value as fuel, is attained by the bluewood of Texas.

The work of restoring the Abbey Church of Croyland was commenced on Thursday last with the removal of the most obviously dangerous portion, the south column of the Norman arch at the west end. The estimated outlay is £3,000. Mr. J. L. Pearson, R.A., is the architect, and Mr. John Thompson, of Peterborough, the builder.

The most recent addition to the casts in the Architectural court at South Kensington Museum is a reproduction of "The Annunciation," by Andrea della Robbia, from the original in the Hospital of the Innocents at Florence. Casts are also being set up in the court, under the direction of Mr. Maudslay, whose workmen moulded them on the spot, of some stone obelisks from ruined temples in Central America, which Mr. Maudslay was the first to describe.

At the Manchester Consistory Court last week a faculty was granted for rebuilding St. Anne's Church, Stanley, which has been taken down, having become unsafe. The architect for the reconstruction is Mr. Charles Aldridge, of Liverpool.

The Skipton and Ilkley Railway was officially inspected on Friday. The party included Major Marindin, Government Inspector; Mr. Needham, superintendent of the line; Mr. Underwood, company's engineer; Mr. Lucas, local engineer; Mr. Moseley, contractor; and Mr. Wilson, the contractor's engineer.

## Building Intelligence.

CATFORD BRIDGE.—St. Dunstan's College was opened by Sir H. Roscoe, M.P., on Monday. It is built from designs by Mr. E. N. Clifton, and will accommodate 400 boys, including 60 boarders. The style is Early Tudor, red bricks, with terracotta dressings and tile roofs, being employed in the construction. The main building contains:—On the ground floor, entrance hall, office, cloak rooms, masters' rooms, five class rooms, and assembly hall; on the first floor are lecture theatre, library, music room, drawing school (with top and side lights), and four class rooms. The second floor is devoted to the dormitories and masters' bedrooms, and the third floor to the kitchen and servants' apartments. In the technical wing of the building are large carpentering and engineering rooms, chemical and physical laboratories, and a lecture theatre. Cricket and football grounds, fives courts, a covered playground, &c., are all provided in the grounds.

CIRENCESTER.—A new Congregational Church in Dyer-street was opened on Thursday, the 20th ult. It has been built from plans by Mr. W. Gillbee Scott, 25, Bedford-row, London, and Mr. T. H. Kingerlee, of Oxford, is the builder. The original contract was £2,445, but the total outlay is about £5,000. Mr. J. Maycock has been the builders' foreman, and Mr. J. Dansfield the clerk of the works. The body of the church is 51ft. by 31ft. 6in., and sitting accommodation is provided for about 500 persons with the gallery. The ceiling is of pitch pine in panels. The seats and woodwork throughout are of selected pitch pine. Ventilation is provided for on Tobin's principle, and the heating is Nevill's high-pressure system.

LAMBETH.—The new reredos presented to the parish church of St. Mary, Lambeth, by Sir Henry Doulton was dedicated on Friday last. The reredos has been executed at the works of Messrs. Doulton, Lambeth, from the designs of Mr. J. Oldrid Scott. With the exception of four columns which are in salt-glazed Doulton-ware, the whole is in a fine terracotta of warm buff tint. It consists of a central portion 8ft. 6in. wide, containing three arched bays; the centre opening is filled with a representation of the Crucifixion, and the arches on either side are sub-divided, and each contains two sculptured figures. Slightly recessed from the central portion there are wings 3ft. wide on either hand, making the total width of the reredos about 14ft. 6in. Up to a height of 5ft. the design is quite plain; the portion next above contains the sculptured panels set within arches, the traceried heads of which are richly elaborated. The central portion is terminated with a projecting cornice with ribbed cove below, and open cresting and pinnacles above; the highest pinnacles will support statuettes of angels. The height to the top of the cresting is 11ft. 9in., and to the top of the statuettes about 15ft. The weight of the whole reredos is carried clear of the floor by means of a concealed girder. The sculptures have been designed and modelled by Mr. George Tinworth. The central panel contains a representation of the Crucifixion. In the four smaller panels are single figures of Moses bearing the table of the Law; Peter carrying a lamb in his right hand; Paul in prison; and Elijah, staff in hand, and attended by two ravens. Inserted in quatrefoil panels in the wings of the reredos are four portraits of archbishops.

SOUTHPORT.—A new Wesleyan chapel was opened on the 20th ult. It occupies a corner site in Southbank-road and Ash-street. The style adopted by the architect, Mr. Waddington, of Burnley, is new in West Lancashire: it is Romanesque, based on the examples found in the south of France. The materials used are red pressed bricks, with white stone dressings. The building consists of a nave with broad transepts, the angle at the corner of the two roads being emphasised by an octagon turret. Internally, no pillars obstruct the view. The nave terminates in a broad apse, in which are the communion table and choir stalls. The three angles of the apse are of stone, and the central arches filled with Venetian mosaic.



Above the communion table are three narrow windows of stained glass by Heaton, Butler, and Bayne, of London, in which Faith, Hope, and Charity are depicted. The nave windows are of tinted glass. The organ chamber (empty at present) is on the ground floor, arched to the ceiling, south of the choir. Open benches are provided for 650 worshippers, the benches and the dado being of pitch pine. A light gallery, with an open front, faces the pulpit. The pulpit, carved choir stalls, and communion table are of Dantsic oak. The inclusive cost of the building, furniture, and gifts is over £6,000.

## CHIPS.

The opening meeting of the Royal Institute of British Architects will be held on Monday, the 5th November, when the presidential address will be delivered by Mr. Alfred Waterhouse, R.A.

The new church of St. Joseph, Greenhill, Swansea, built from the designs of Messrs. Pugin and Pugin, of Westminster, was opened on Thursday in last week. The tower and spire will be added hereafter. Mr. Cruikshank has been the clerk of works.

Mr. Bolton, who has recently been appointed borough surveyor of Oswestry, in succession to Mr. H. T. Wakelam, has been presented with a black marble timepiece by the employés of the sanitary department of the borough of Wigan, on the occasion of his resigning the assistant surveyorship of Wigan. He was also presented with a gold appendage by the men of the paying department, and with a sum of money by the employés in the sewerage section.

Guide School, near Blackburn, has been reopened after being extended and entirely remodelled, under the supervision of Mr. James Bertwistle, F.S.I., architect, Blackburn, whose plans were selected in competition.

The annual distribution of prizes and certificates to students of the Liverpool Science and Art Classes took place on Saturday evening in the Lecture Hall of the Free Library, William Brown-street. The annual report presented by Mr. A. Norman Tate showed that some excellent work had been accomplished during the past session—a fact which was referred to by Professor Hele Shaw in the course of his address to the students.

The interior of the church of St. Maurice, Monksgate, York, is being redecorated in spinet fresco by Mr. J. W. Knowles, of Stonegate, York.

A Runic cross, 7ft. high, composed of a single piece of Carrara marble, has been erected in the Southampton Cemetery at the grave of the late Alderman Dunlop. The four arms of the cross have an interlaced pattern out in them, whilst on the shaft is a sunken panel, containing an inscription in lead letters. The work has been executed by Messrs. Garrett and Haysom, of East-street, Southampton.

A stained-glass window, which has been placed in Manchester Cathedral by Mr. C. J. Schofield, of that city, in memory of General Gordon, was unveiled on Saturday. The window represents Gordon standing in the city of Khartoum, gazing into the distance for the expected relief, while around stand Soudanese gazing upon him mournfully. The window is the work of Messrs. Wilson and Whitehouse.

The Baroness Burdett-Countess unveiled on Monday the statue of the seventh Earl of Shaftesbury, which has been placed in Westminster Abbey, near the western door. The statue is the work of Mr. Boehm, R.A., and was executed from a bust by the same artist, which was finished from life a few years before his lordship's death. He is represented in the robes of the Garter, with his hands clasped in front. The statue is about 8ft. 6in. high, and is placed upon a marble pedestal.

The new railway of the Brighton and South Coast Company between Oxted and Groombridge, was opened on Monday. The new railway has been constructed from the plans of Mr. F. D. Banister, resident engineer of the company, under the personal supervision of Mr. George Lopes, assistant and resident engineer. It is 15 miles in length, and considerably shortens the route between London and Tunbridge Wells and Eastbourne.

Plans and elevations have been prepared by Messrs. Horsfall and Williams, architects, for a new Congregational church at Heath, Halifax. It is proposed to build the school first, which for a time will also serve as the church. The style will be Early English of the thirteenth century. The large room for church purposes will be on the first floor, and will accommodate 440. The school will be on the lower floor, and will accommodate 250. There will be four class-rooms. Ultimately, when the church is built, it is intended to occupy all this floor with class-rooms.

## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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## ADVERTISEMENT CHARGES.

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## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

## NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII., XLVI., XLIX., L., LI., LII., LIII., and LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—F. W. R. and Co.—W. B. S. and Son.—C. B.—F. W. M.—B. of S.—B. D. and Co.—C. T. and Son.—D. and F.—B. of B.—S. and C.—J. A.—S. S. and Co.

JAS. ATKINSON. (We have no more space to spare. The point at issue has been argued out, and readers must form their own opinions. Your letter simply contains a description of a well known graphic method of obtaining shears as usually understood.)—PHILIP M. (Try Hill and Hodges' patent door spring.)—R. M. (Why will not a sunlight do? Write Stode and Co.)—J. D. L. (W. H. Lascelles and Co., or J. T. Chappell—if we understand you rightly; people who seek a recommendation should be specific.)—BATH. (Ewart's Lightning Geyser will give you hot water in five minutes.)—PUZZLED. (Try Roberts's rain-water separator.)—L. L. (You can see some very nice marble mantels at A. Boucneau and Son's, 48, Warren-street, W.)—JOINER. (We prefer Stephens' stains—those you name are sticky and not durable.)—B. J. (Putney's Pavodillos seem just what you want.)—JACK STRAW. (Burt and Pott's are certainly the best.)

## Correspondence.

## CLASS OF MASONRY.

To the Editor of the BUILDING NEWS.

SIR,—As several students who were desirous of following my course of lessons of masonry have been prevented from doing so, on account of their not being able to attend twice a week, it has been resolved that the class be held only once a week—viz., Monday evening, at 7.30.

To suit the convenience of students who have not been able to join on the 17th of September, a second class will be established, to begin on Thursday evening, October 25th, and to be held once a week, on every subsequent Thursday.

As there are students for whom a day class will be more convenient, another class will be established, to begin on Monday morning, at 10, October 22nd, and to be held once a week, on every subsequent Monday morning, from 10 to 12 o'clock.

Each course will consist of 30 lessons. Fee for each course, 2½ guineas. Applications to be sent as soon as possible to Sir Philip Magnus,

Director, City and Guilds of London Institute, Exhibition-road, S.W.

As to the *Upper Course*, it will be organised as soon as a sufficient number of students are found whose previous study of masonry renders them capable of following it with profit.

It is also proposed to form a *Travelling Class*, with the purpose of taking accurate measured drawings of interesting examples of vaulting, and reproducing the same in models, so as to eventually form a collection of easily-to-be-consulted documents. We should begin our operations in London, where there is already much worthy of study, then pass on to the other parts of Great Britain, and ultimately pursue our studies abroad. Of course, this scheme cannot be realised before we have a body of students thoroughly trained in the science of masonry.—I am, &c.,

LAWRENCE HARVEY.

## THE RIGHT TO REDEEM A MORTGAGE.

SIR,—I have read with deep interest your remarks upon the above, as given in your last issue. I think, however, some further explanation is desirable, as from those remarks, unless I have mistaken their meaning, it would appear that the legal estate of the property mortgaged became vested in the tenant, he having redeemed it by paying off the mortgage. But if this view is correct, it will surely upset all preconceived ideas as to a mortgagor's power or option to redeem his property by paying off the mortgage thereon, and will, at the same time, I think, open up the way for possible fraudulent connivance between tenants and mortgagees; for, according to the rule laid down, a tenant has the right to redeem any property he may have leased through the action of, say, a friendly mortgagee, and to take away the mortgagor's interest in the equity, which may, or may not, be of considerable value.

I shall be very glad if you can find room in your next issue for a further explanation of the question, as it is a most important one.—I am, &c.,

W. H. JAMES, Surveyor and Valuer.  
20, Hamilton-square, Birkenhead, Oct. 2.

## THE STAIRCASE, MERCERS' HALL.

SIR,—My attention has just been called to your article No. VI. on "Halls and Staircases," in the course of which you quote the staircase of Mercers' Hall, of which you give a sketch, and you append the name of the late Edward P'Anson. This talented architect had, however, nothing to do with the alterations of Mercers' Hall, and the staircase in question was entirely designed and carried out by my father, John Gregory Craze, to whom the empty brick shell (of very awkward form) was handed over to work upon.

I believe it to be one of my father's most successful efforts, although undertaken when he was past seventy, and shall feel obliged if you think well to correct the error.—I am, &c.,

J. D. CRAZE.

## BARFRESTON CHURCH.

SIR,—Mr. Austen is plainly desirous of fomenting a quarrel.

His statement is quite untrue as to the correspondence between Mr. Seddon and me. I have sent you Mr. Seddon's letter; he therein states that he has received the letter sent to Mr. Austen, but makes no further remark about it. No apology was required or given.—I am, &c.,

P. E. MASEY.

Harold-street, S.E., Oct. 2.

## ENGINEERS' COMMISSION.

SIR,—On page 761 of the BUILDING NEWS of 25th May last you recorded a case, "Hawkesley v. the Liverpool Corporation," in which the amount in dispute (£31,721) was a question of engineers' fees—commission on the works executed, I conclude. Could you, or could one of your readers, give the cost of the works executed in connection with the Vyrnwy water scheme?

And, *a propos* of this, will you say also what is the usual commission paid to engineers in England for the designing and carrying out of water-supply schemes? If it be a commission on the amount expended, as with architects, does it include all assistants employed, or are the



resident engineer, the assistant engineers, and inspectors paid separately?

I have heard that 10 per cent. was paid on the cost of the Metropolitan Railway engineering. If this were so, would it include assistants?

Any information as to fact and custom would oblige.—I am, &c.,  
South Africa. COLONIST.

## Intercommunication.

### QUESTIONS.

[9767].—**Acoustics.**—Would some experienced reader kindly inform me how to improve the acoustic properties of a hall 84ft. in length and 37ft. wide, and 25ft. high from floor to ceiling? It has lath and plaster walls all round, and the ceiling is of the same material. Light is admitted by three windows in one of the gables, and five windows in one of the elevations; the other walls are great dead walls. Gas chandeliers, three in number, are employed for lighting artificially. There are fixed pews in the body of the hall, with a raised platform at the end (where the windows are) facing the street. Speaking from this platform, it is hardly possible to make oneself distinctly heard at the other end of the hall.—AURIS.

[9768].—**Mensuration.**—In what way is a portion of the area of an egg-shaped sewer calculated? Tables give the areas of  $\frac{1}{2}$  and  $\frac{3}{4}$  full, but how do you obtain intermediate areas for other depths, say 10 or 11in. deep?—STUDENT.

[9769].—**Damp-proof Course.**—What is the cost per foot super. of a damp-proof course composed of tar and pitch—say,  $\frac{1}{2}$ in. thick, and what would be the proportion of either to use?—SUBSCRIBER.

[9770].—**Galvanic Action.**—In securing leaded lights to galvanised iron stay-bars with soldered copper-wire, would a destructive galvanic action be set up? Assuming the galvanising of the iron stay, would it be wiser to use malleable zinc wire instead of copper-wire for the tyings? The zinc wire would be less malleable than the copper, and, considered by itself, less lasting; but with the galvanised iron might possibly have a longer life than copper-wire.—W.

[9771].—**Waxed Bricks.**—F. Marion Crawford, writing "Sant Ilario" in the current number of the *English Illustrated Magazine*, describing one of the inferior rooms of an old palace in Rome, says "the floor of the room was of red bricks, which had once been waxed." What is the process of brick waxing, and to what kind of brick is, or was, the waxing applied, or does brick here mean tile, open-textured and coarsish for tile, yet finer and closer in grain than brick?—R.

[9772].—**Pencil Cedar.**—Will any of your readers kindly say whether there is any means of preventing cedar-wood drawers depositing a sticky coating on the coins, shells, &c., contained in them? The drawers themselves are perfectly clean and dry. Would varnishing them be of any use?—L.

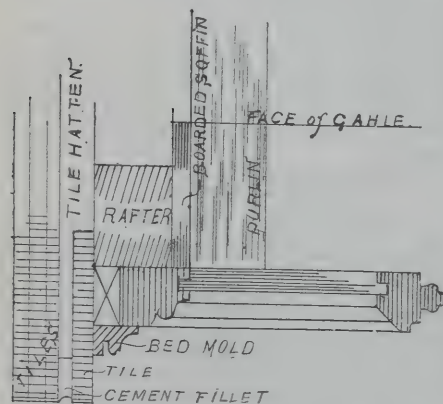
[9773].—**Paper Doors.**—A year or two ago some talk was made of using compressed paper in one form or other for doors instead of wood. I should be obliged if any reader could give me information upon the subject, or could name any firm who makes or would undertake their manufacture?—C. B. YOUNG.

[9774].—**School.**—Will some reader inform me what number of square feet are required for infant schools; also size of playground, windows, &c.?—W. H. L.

[9775].—**Chemistry of Building Materials.**—Would some reader inform me as to what are the best books to study for chemistry and mineralogy of building materials, as required for the examination for assistant surveyors in the Royal Engineer Department of the War Office?—W. H. L.

### REPLIES.

[9750].—**Barge Board.**—In answer to "M.'s" enquiry of the 14th inst., I inclose sketch of section of



barge board (not to scale) showing manner of fixing it.—H. P. A.

[9763].—**Hydraulics.**—The discharge from a 2in. stand-pipe under the conditions stated by "Fire Brigade" would be 388 gallons per minute. This result would be

obtained as follows:—First assuming the discharge to be, say, 400 gals. per minute, by the formula  $H = \left( \frac{G}{d^2 \times .24} \right)^2$

in which H = head in feet on stand-pipe required to discharge 400 gals. per min.; d = diameter of stand pipe in  $\frac{1}{8}$ ths of an inch; and G = gallons discharged per min., we obtain 42.385ft. = H. Then, by the formula  $H = \frac{G^2 \times L}{(3d)^5}$ , in which H = loss of head due to friction, L = length of pipe in yards, G = gals. per min., d = dia. of pipe in inches, we obtain for the 10in. pipes a loss of 17.383ft. head, for the 7in. pipes 103.425ft., and for the 6in. pipes 42.337ft. By the formula  $H = \left( \frac{G}{d^2 \times .13} \right)^2$ , in

which the letters used represent the same as in formula for friction, we obtain .095ft. as the loss of head due to velocity of entry. For the loss due to change of direction, the formula  $H = \left\{ .131 + \left( 1.847 \times \left( \frac{r}{R} \right)^2 \right) \right\}$

$\times \frac{V^2 \times \phi}{960}$ , in which H = head due to change of direction

in inches, R = radius of the centre line of the bend in inches, r = radius of the bore of the pipe in inches,  $\phi$  = angle of bend in inches, V = velocity of discharge in feet per second, gives for each easy bend in 10in. main .056949in.; head in 7in. main, .20548in., and in 6in. main .38916; these three added, and the sum multiplied by 6, gives 3.909474in. For the quick bend in 10in. main .31769in., in 7in. main .766043in., in 6in. main 1.2732in.; added together, this is 3.566937in., and multiplied by 3 gives 7.070801in.; add to the total of these two products the loss at outlet bend of stand-pipe = 82.25018in., we obtain a total loss for change of direction of 43.2304551in., or 3.60284ft. The sum of these several heads gives 209.228ft. as the head required to discharge the assumed 400 gals. per minute; but the head given was 200ft. in the main, and deducting, say, 3ft. for the stand-pipe, we obtain for the given head on stand-pipe 197ft., whence we obtain  $\frac{400 \times \sqrt{197}}{\sqrt{209.228}} = 388$  gallons per minute as the discharge required. Ordinarily in long mains, and where these are large, it is usual to disregard the loss due to change of direction and to velocity of entry.—F. E. GAY, Bath.

[9764].—**Discharging Sewage on Top of the Tide.**—This is a very bad style of doing things, and apt to cause a dirty deposit to be left above low water. It is more sensible to discharge the sewage as far out as possible beyond low-water mark, especially when a large extent of shore surface is exposed when the tide is low. I remember visiting a number of years ago a small coast town with a beautiful clean sandy beach. I visited it a few years afterwards, when the beach was foul and dirty-looking at low water, owing to a sewage pipe which was made to discharge into the sea a considerable distance above low-water mark. I was so much disgusted that I lost taste of the place, and have never gone back since.—W. P. BUCHAN.

[9765].—**Emigration.**—Unless "Angus" is firmly wedded to the idea of going out to New Zealand, I, as an architect lately returned therefrom after five years' residence in the Colony, would strongly advise him to change his plans. The profession is already quite overstocked there, and he would have very little chance of getting any employment in an office, and none whatever if he started on his own account. I would rather recommend "Angus" to make inquiries respecting British Columbia or the southern coast towns of California, where, I understand, there is more chance of obtaining work.—MAORI.

[9766].—**Sapwood and Dry-Rot.**—Sapwood (alburnum) is the external zone of an exogen, and the vital part of the tree, the woody cells being open for the passage or ascension of the sap. This sap is soluble in water, and from its albuminous composition is highly fermentable in any state except that of the living tree. Heartwood (duramen) is the internal portion of an exogen; it represents the passive part of the tree having no connection with the active or vital part, proof of which is furnished in the fact that the tree will flourish when this perfect wood has been eaten away by fungi or disease. The cells of this heartwood, unlike the sapwood, are closed, having imbibed the secretory matter peculiar to the tree, such matter being supplied by the liber, or inner bark, through the horizontal system of cells which pass from the bark to the internal parts of the tree. This horizontal system, which plays such an active part in the formation of heartwood, is apparent in the oak, beech, sycamore, and other woods, where it is known as the silver grain, &c.; it exists in all coniferous woods, although scarcely apparent to the naked eye. This secretory matter in the case of the red or yellow fir of Europe, *Pinus sylvestris*, is resinous, and hence it is insoluble in water. This insolubility gives durability to the wood, and the more resinous, as in the instance of Memel and Dantzic shipments, the more pronounced is this quality. This peculiarity is not shared by the pitch pine (*Pinus australis*) of the Southern States of America, which, although more highly impregnated with resinous matter than the European fir, is not so durable or proof against the insidious attack of fungi. "Dry-rot," the popular name of the parasitical fungi which feed on wood, and under favourable conditions of moisture, temperature, and stagnant air, bring about its dissolution, is a misnomer, for rot in wood is not associated with dryness. It would be more correct to term it "wet-rot"; but we must take it as we find it, the term, no doubt an old one, being evidently derived from the fact that it reduces the wood to a charred or powdered state. Sapwood is not generally charged with the introduction of dry-rot to the heartwood, but it is unquestionably more prone, from its absorbent character than the more compact heartwood, to the attack of disease. The objection to the use of sapwood in buildings is based upon its general inferiority; it is soft, tender, and prone to the attack of parasitic vegetation and the larva of the furniture beetle, *Anobium striatum*. These destructive agents, under certain conditions, exist entirely or exclusively upon the sapwood, and leave the heartwood intact. You may instance this in a post of fir, where the sapwood has been entirely eaten away by fungi, the heartwood being left sound and intact, or in a beam of fir where the angles or corners of sapwood have been reduced to powder by the boring operations of the above larva or worm. The simple explanation is that the sapwood is more congenial

for animal and vegetable parasites than the heartwood. The objection to sapwood is that it is imperfect wood, defenceless against the attack of parasites, and consequently unreliable as timber, and not that it is a collector and disseminator of disease. Sapwood is not a despicable class of wood under certain conditions. If kept dry, and more especially under paint, as in doors and internal fittings, it will last a long time, and fulfil all reasonable expectations; but where used for timbering or constructional purposes—i.e., not protected by a dry atmosphere or paint—it is prone to the attack of fungi, of which the dry-rot fungus, *Merulius tachrymans*, is an important member. Sapwood is of itself absorbent, and given the requisite heat, its destruction by this agency is certain. Heartwood is less absorbent, and hence one of the elements necessary to its growth and development is so far wanting that in many cases it is proof against attack. The same remark applies to its destruction by mechanical agency, a form which may exist without the presence of any high degree of moisture; the heartwood may be, and invariably is, proof against attack from the fact that its secretory matter is unpalatable as food to wood-boring insects. These insects, as in their operations upon books, where they are searching after the binders' spines, spend their lives in this larva state in one ceaseless round of search for albuminous food. There is very little difference between animals and vegetables. They are each endowed with the instinct of searching for and selecting their food, and this they do with a sense of fitness which in the main is beyond human conception. The old saying that "What is sauce for the goose is sauce for the gander," does not apply in this case, for plants and animals of a low order may, and invariably do, feed upon the albuminous tissue of sapwood, and refuse to extend their operations to the less congenial and unsavoury heartwood. The field opened by "R." in his question as above is a very wide one, and, although I have trespassed to my full limit in these columns, I feel that I have scarcely done justice to the subject. I therefore conclude with the remark that if I have failed to touch sufficiently on any salient point I shall be pleased upon having my attention called to the same to revert to the subject.—W. STEVENSON, The Park, Scarborough.

### WATER SUPPLY AND SANITARY MATTERS.

**FEATHERSTONE SEWAGE WORKS.**—The Local Board of Featherstone, near Leeds, have received notice of complaint from Lord St. Oswald, as to the nuisance arising from their present sewage farm. Mr. M. Paterson, M.Inst.C.E., of Bradford, has been instructed to report as to the best means of remedying the nuisance. His conclusions are: (1) That the 25 acres of land now leased to the Board for sewage irrigation by gravitation are useless, being 4ft. or 5ft. of strong and intractable clay, with no soil worthy of the name; (2) that to lift the sewage 50ft. on to the nearest land suitable would cost £5,000; (3) that precipitation works would be more costly than land filtration, with a less efficient result; and (4) that land filtration works embracing five acres of land, at a cost of £1,250, offers the best practicable means of extricating the Board from their present dilemma.

### CHIPS.

The foundation-stone of a new church of St. Thomas was laid in Rhyddings Park-road, Swansea, on Thursday in last week. Messrs. Nicholson and Son, of Hereford, are the architects, and the contractor is Mr. Henry Smith, of Kidderminster. The outlay will be about £5,000.

Six rudely-formed urns containing burnt human bones, and many stone implements, have just been found in a field adjoining Dummer Clump, Maidenhead, on the estate of Sir Nelson Rycroft.

Mr. James Weir is the architect of New Surrey Chapel, in Blackfriars-road, opened on Wednesday week.

Memorial stones of a new Wesleyan chapel and schools at Cleckheaton were laid on Saturday. The chapel will seat 870 persons. Mr. W. H. Howorth, of Cleckheaton, is the architect, and the outlay will be £8,000.

The chancel of the parish church of Easton, near Grantham, was reopened last week after restorations carried out from plans by Mr. Corby. Messrs. W. and J. Perkins, of Easton, were the builders.

Branch co-operative stores are in course of erection at the corner of Tanner's-lane and Winwick-street, Warrington. The building is of brick, with stone facings. There will be a fireproof three-story bakery at the rear, and over the principal building there will be a room, to be used for public meetings and concerts, 58ft. long and 54ft. wide, exclusive of the platform, as well as a supper-room 44ft. long and 32ft. wide. In the front of the main building there will be five shops for various departments. The architect is Mr. William Owen, and the builders Messrs. Gibson and Son, all of Warrington.

Messrs. J. Whitehead and Sons, granite merchants, Aberdeen, have completed a granite pedestal for the statue by Mr. Hayard Thomas of the late Mr. Samuel Morley, which is to be erected at Nottingham. The pedestal is formed of red Peterhead granite, the foundation base being of grey Persley granite. It is about 9ft. high.



## Our Office Table.

THE sessional lectures at the Royal Academy will be opened on Monday evening next, at 8 p.m., when Dr. John Marshall, F.R.S., will deliver the first of a course of nine Anatomical addresses to the students on the bones, joints, and muscles of the human body; the lectures will be given each Monday and Tuesday evening till, and including, November 5th. The lectures on Chemistry, six in number, will be delivered by Mr. Arthur H. Church, M.A., F.R.S., on Mondays and Thursdays, Nov. 8, 12, 15, 19, 22, and 26, the subjects to be dealt with being the chemistry of panel, canvas, and other painting grounds, of drying oils, pigments, and varnishes, and, on the closing night, of the process of oil-painting regarded as a whole. Six lectures on Painting will be given by Mr. J. E. Hodgson, R.A., during January, when also Dr. Marshall undertakes a course of nine demonstrations in Anatomy. The subject of the lectures in Architecture, by Professor George Aitchison, A.R.A., this session is Roman Art; the addresses, six in number, will be delivered on Monday and Thursday evenings, Jan. 28 and 31, Feb. 4, 7, 11, and 14, 1889. Arrangements for the delivering of the lectures in Sculpture have not been made.

We regret to announce the sudden death from heart disease of Mr. T. Gambier-Parry, of Highnam Court, Gloucestershire, the well-known amateur artist. Mr. Parry, who died on Friday evening, was educated at Eton and Trinity College, Cambridge; he was well known as a disciple of art, and wrote several books on the subject, his last being called "The Ministry of Art." He was a practical as well as a theoretical artist, and much of the painting in Ely and Gloucester Cathedrals is the work of his hand. Mr. Parry also built, endowed, and beautified by frescoes Highnam Church. He held many public appointments in Gloucester, including that of president of the city School of Art, and was foremost in all good and charitable works. For many years he had taken an active part in the arrangement of the art-loan exhibitions at the Church Congresses, and frequently read papers at those meetings and before the R.I.B.A.

At Leeds the permanent fine-art gallery which has been provided by the corporation was opened on Wednesday. A building has been provided, from Mr. W. H. Thorp's designs, in extension of the Municipal buildings, at a cost of over £10,000. The collection of pictures with which it is hung for public inspection contains between 500 and 600 exhibits, and is superior to anything of its kind that has been seen at Leeds since the great exhibition at the opening of the new general infirmary in 1868. The loan pictures are very numerous. Mrs. Butler's "Roll Call" has the place of honour in the south room. It is hung upon a screen in the centre of the room, the other side of the screen being occupied by Mr. P. H. Calderon's "Aphrodite." In the central court are various works of art contributed by the South Kensington authorities, including two portraits by Gainsborough—"Mrs. Gainsborough when Young" and the "Hon. Wm. Pitt, M.P." A couple of rooms adjoining the vestibule are devoted to water-colours. The building is illuminated by 1,000 Edison-Swan incandescent or glow lamps of 16-candle power each. In addition, the central hall is to be lighted with six incandescent lamps of 500-candle power.

PROFESSOR H. S. HELE-SHAW, of Liverpool University College, has adopted an excellent mode of popularising his course of lectures on "The Application of Graphic Methods to Engineering Problems," by presenting a dozen free tickets for the whole course to working men. These tickets have been eagerly taken up by members of the Trades Council, and a dozen representatives will attend the course. The value of the graphic method as opposed to the old system of solving physical problems is attracting a great deal of attention just now, and at the last meeting of the British Association, it will be remembered, it was resolved to vote £25 to investigate the subject. Professor Hele-Shaw is the secretary of the committee appointed for this purpose, and he will have a fair opportunity to work out the method and

explain it to his students during the coming year. The first lecture of the course—free to the public—will be given in the Chemical Laboratory, Brownlow-street, Liverpool, on Friday evening in next week.

DURING recent years many experiments have been carried out to show in what manner wood can be rendered non-inflammable. M. Boudin and M. Donny, of the Ghent University, lately conducted some experiments at the request of the Belgian Minister of Public Works. The conclusions arrived at were that, though wood cannot be made fireproof, it is possible to deprive it to a large extent of the property of catching and communicating fire. To this end it is sufficient to coat the wood with a substance that will not be expensive in application or cause delay, and will not be injurious to metal. The process, too, should be easy, and the composition should be capable of receiving a coat of ordinary paint. Coating with a brush appears to be the most ready and practical mode of applying any fire-resisting composition, and those recommended are cyanide of potassium and asbestos paint. We know the effect of the latter paint in the buildings of the late Inventions and Colonial Exhibitions at South Kensington.

At a meeting of the court of the Worshipful Company of Plumbers, held at the City Guildhall on Saturday, Mr. William Henry Bishop, Royal Exchange-buildings, was sworn into the office of Master of that company; Mr. Charles Hudson, Greenwich, to that of Upper Warden; and Mr. Digby Seymour, Q.C., Temple, to that of Renter Warden, for the ensuing year. At the same meeting the honorary freedom of the company was conferred upon Messrs. W. H. Perry, W. H. Allen, J. Ratcliffe, and W. Sevenoaks, four practical plumbers, who succeeded in passing in honours the City and Guilds of London Institute technological examination for plumbers, and who are now engaged as certificated teachers of plumbers' classes in the technical schools at Bristol, Cardiff, Manchester, and Windsor respectively.

A MEETING interested in the registration and special training of plumbers was held at West Hartlepool this week; the mayor presided. The chairman drew attention to the public importance of the object which the meeting was called to promote. It might be asked why plumbers should receive more attention than any other class of craftsmen? He had no doubt, however, that when they came to consider the serious injury to health which might result from the imperfect joining of a drain-pipe, they would see how absolutely necessary it was that plumbers should undergo proper training. They might just as well have no drain-pipes at all as have bad connections. The secretary of the district council for the registration of plumbers explained the way in which the system was established by the Worshipful Company of Plumbers at the "Healtheries," and drew attention to the fact that their object was not limited to the mere registration of plumbers, but included a scheme for the training of apprentices in subjects which would be of the greatest use to them in the exercise of their craft. Councillor Pyman (Chairman of the Health Committee), Mr. Brown, C.E., Dr. Gourley, and Councillor Barry were elected to represent the public, and four master and four operative plumbers to represent the trade on the district council.

PROFESSOR F. KNOKE has just reported on the Roman plank-roads recently discovered on the moor between Mehrholz and Brägel, not far from Diepholz, in Lower Hanover. He was able to trace the lines of two parallel plank-roads right across the moor, both being evidently Roman works. One of them has been demolished by force, while the other seems to have fallen into decay; but there are signs of repairs executed even during the Roman period. Those repairs seem to have been carried out hastily, for in one place a mallet, employed probably to drive home the pegs, was found on the track, forgotten, no doubt, by the workmen. They appear to be the *pontes longi* which were used A.D. 15 by the Roman commander, A. Cæcina, in his retreat from Germany to the Ems.

THE *Moniteur Industriel* states that the six principal railway companies of France use more than 10,000 sleepers per day, or 3,650,000

per annum. As a tree of the usual dimensions will give only ten sleepers, the railways in question require 1,000 trees per day for sleepers alone. In the United States the consumption is much greater, amounting to some 15,000,000 sleepers a year, which is equivalent to the destruction of about 170,000 acres of forest. The annual consumption of sleepers by the railways of the world is more than 40,000,000. The rapid progress of disafforestation is therefore evident, and it is certain that the natural growth cannot keep pace with it.

THE twenty-fourth annual report of the Pearl Assurance Company demonstrates energy and continued success. The premium income of the company for the financial year ending June, 1878, amounted to £58,396 19s. 4d.; it now reaches the sum of £233,030 19s. 2½d., showing that for the past decade the income of the company has nearly quadrupled. 391,965 policies were issued during the past twelve months, representing a new annual premium income of £153,559 1s. 7d. The total income for the past financial year amounted to £239,413 4s. 11d., and exceeded that of the previous year by £20,565 1s. 11d.

### MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Academy, Anatomy Lecture No. 1, by J. Marshall, F.R.S. 8 p.m.  
Liverpool Art Workers' Club. Discussion on "Mosaic and Glass Painting."

FRIDAY.—Royal Academy, Anatomy Lecture No. 2, by J. Marshall, F.R.S. 8 p.m.

**Architectural Association, 9, Conduit-street, W.**—The first Ordinary Meeting will be held on October 19, when the President will deliver an Address and present the prizes. Particulars of the Classes can be obtained from the undermentioned Secretaries, and the Classes will be held on the following dates:—

- Oct. 9.—Class of Construction. Preliminary Meeting. The Visitor will attend and give advice re study for next meeting.
- Oct. 12.—Elementary Class of Design, Sect. I. and II. W. A. Lewis, 71, Richmond-road, Dalston, N.
- Oct. 15.—Lectures on Graphic Statics. F. W. Quick, 157, Wool Exchange, E.C.
- Oct. 22.—Lectures on Theoretical and Applied Mechanics. F. W. Quick, 157, Wool Exchange, E.C.
- Oct. 23.—Lectures on Geology of London. F. R. Farrow, 2, New Court, Carey-street, W.C.
- Oct. 24.—Advanced Class of Construction. F. T. W. Goldsmith, 2, Weymouth-street, Portland-place, W.
- Oct. 26.—Lectures on Construction. W. Mills, 26, Budge-row, Cannon-street, E.C.
- Nov. 1.—Lectures on History of Architecture. T. E. Fryce, 35, Bedford-row, W.C.
- Nov. 8.—Class of Colour Decoration. C. J. L. de Beaupré, 66, First Avenue, Queen's Park, W.
- Nov. 9.—Class of Design. F. R. Farrow, 2, New Court, Carey-street, W.C.

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### CHIPS.

The names of the following builders and contractors, James Andrew Mountford, Smallheath, Birmingham; Richard Myerscough, Preston, and William Bolton, Partington Hereford, appear in Wednesday's list of receiving orders.

A new church and schools are about to be built at Moss-side, Manchester, from plans by Messrs. Isitt and Verity, of Bradford.

The Whitworth trustees offer to provide funds for adding a hospital to Owens College, Manchester, and will provide the site and £35,000 towards the cost of building and furnishing the institution. The offer has been accepted.

The foundation stone of a new mission room and church school was laid on Saturday last in Dollman-street, Ashted. The architects are Messrs. Osborn and Reading, and the contractors Messrs. Barnsley and Sons, of Birmingham.

The memorial statue of the late Mr. W. E. Forster, to be erected in Forster-square, Bradford, will be executed by Mr. Thomas.

Alterations have been made to the Guildhall, Exeter, embracing the ventilation, which is now carried out on the Boyle system, the latest improved form of the self-acting air-pump ventilator being adopted for the extraction of the vitiated air.



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## TENDERS.

\* \* Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

**ASHFORD, KENT.**—For making up three roads on the Farbrace Estate, for the local board:—  
**Wallis and Sons, Maidstone (accepted)** £315, £229, and £66 respectively.

**ASHDOWN PARK.**—For the erection of a lodge at High Beeches, Ashdown Park. **Mr. S. W. Haughton, M.S.A., East Grinstead and Tunbridge Wells, architect and surveyor:**—  
**Pledge, W., East Grinstead (accepted)** £215 17 0

**ASHDOWN PARK.**—For the erection of a lodge at Wytech Cross, Ashdown Park. **Mr. S. W. Haughton, M.S.A., East Grinstead and Tunbridge Wells, architect and surveyor:**—  
**Pledge, W., East Grinstead (accepted)** ... £283

**BANCHORY, N.B.**—For the supply of patent shutters, for new residence, for **Mr. J. G. Chalmers, Corsee:—**  
**Stones, J., Ure Mills, Ulverston (accepted).**

**BAYSWATER.**—For alterations and shop-fittings at No. 80, Queen's-road, W., for **Mr. E. P. Joyce. Mr. W. A. Burr, M.S.A., 65, Chancery-lane, W.C., architect:—**

Bray and Pope ...	...	£329 0 0
Young and Co. ...	...	299 0 0
Larke and Son ...	...	296 0 0
Stevens Bros., 148, Seven Sisters-road, N. (accepted) ...	...	267 10 0

**BRISTOL.**—For new mixed school for 360 children, for the Bristol School Board. **Mr. W. L. Bernard, 39, Broad-street, Bristol, architect. Quantities by the architect:—**

	A.	B.
Gay, E. ...	£4 035 0 0	£724 0 0
Wilkins, J., and Son ...	3,985 0 0	730 0 0
Mereweather, W. ...	—	712 0 0
Walters, E. ...	3,943 0 0	600 0 0
Beacham and Balmont ...	3,918 0 0	656 0 0
Church, W. ...	3,825 0 0	675 0 0
Lewis, T. R. ...	3,800 0 0	620 0 0
Stephens and Bastow ...	3,759 0 0	—
Rossiter, H. J. ...	3,750 0 0	627 0 0
Davis, J. E. ...	3,730 0 0	679 0 0
Beaven, A. J. ...	3,690 0 0	679 0 0
Cowlin, W., and Son ...	3,673 0 0	660 0 0
Humphreys, G. ...	3,668 0 0	634 0 0
Forse ...	3,650 0 0	675 0 0
Facey, R. Taunton ...	3,595 0 0	597 0 0
Eastbrook and Son ...	3,574 0 0	698 0 0
Hayes, C. A. ...	3,570 0 0	611 0 0
Hill, A. ...	3,530 0 0	586 0 0
Turner, S. ...	3,490 0 0	537 0 0
Perrott, J. (accepted) ...	3,490 0 0	673 0 0

Rest of Bristol.  
A.—Buildings including foundations. B.—Foundations alone.

**BELLAGIO.**—For the erection of a bungalow on plot 62, St. Margaret's-avenue, for the Bellagio Estate Co. **Mr. W. J. Ebbetts, F.R.I.B.A., Savoy House, 115, Strand, architect:—**  
**Baylis, H., Highbury (accepted).**

**BELLAGIO.**—For the erection of an entrance lodge at above, near Read's Farm, with entrance gates and fencing, for the Bellagio Estate Co. **Mr. W. J. Ebbetts, F.R.I.B.A., Savoy House, 115, Strand, W.C., architect:—**  
**Baylis, H., Highbury (accepted).**

**CHATHAM.**—For the erection of a model common lodging-house on Smithfield Bank. **Mr. G. E. Bond, M.S.A., architect:—**

Skinner, C. E., Chatham ...	£2,568 0 0
Multon and Wallis, Gravesend ...	2,568 0 0
Naylor, J. G., and Son, Rochester ...	2,529 0 0
Eiser and Bockham, Chatham ...	2,425 0 0
Nye Bros., Rochester ...	2,393 0 0
Calland and Son, Rochester ...	2,280 0 0
Pankhurst, T., Chatham ...	2,155 12 0
Seagars, E. D., Chatham (accepted) ...	1,900 0 0

**EAST GRINSTEAD.**—For the erection of a dwelling-house and shop, London-road, East Grinstead, for **Mr. G. Arnold. Mr. S. W. Haughton, M.S.A., East Grinstead and Tunbridge Wells, architect and surveyor:—**

Morris, J., Ashurst Wood ...	£497 0 0
Charlwood Bros., East Grinstead* ...	484 0 0
Foster, A., East Grinstead ...	475 0 0

\* Accepted.  
**EXETER.**—For new drainage system at the City Work-house, for the Corporation of Guardians. Messrs. Wilkinson and Warren, Post Office Chambers, Exeter, surveyors to the Guardians. Quantities supplied:—

Hull, Southampton ...	£1,793 0 0
Seadding and Son ...	1,350 0 0
Tree and Bolley ...	1,279 0 0
Hubber and Son ...	1,080 0 0
Stephens, J. G. ...	1,070 0 0
Coles ...	1,060 9 0
Phillips ...	1,005 0 0
Setter Bros.* ...	998 0 0

Surveyor's estimate, £1,062 10s. \* Accepted conditionally.

Rest of Exeter.  
**HARTFIELD.**—For the erection of three cottages at Hartfield, for **Mr. R. S. Killick, Groombridge. Mr. S. W. Haughton, M.S.A., East Grinstead and Tunbridge Wells, architect and surveyor:—**

White and Humphries, Tunbridge Wells ...	£549 0 0
Luxford, J., Forest Row ...	535 13 0
Farmor, R. O., Hartfield ...	498 0 0
Mighall, R. O., West Hoathly ...	478 0 0
Charlwood Bros., East Grinstead* ...	474 0 0
Pledge, W., East Grinstead ...	377 0 0

\* Accepted.

**IPSWICH.**—For new mains and hydrants at public hall, for the corporation. **Mr. E. Buckham, borough surveyor:—**

Stearn, C. ...	£71 0 0
Warner ...	67 10 0
Stearn, A., and Son ...	67 10 0
Crisp and Smith (accepted) ...	65 0 0

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Accrington	Dublin	Earl's Court	Kensal Green	Moorgate-street	Soho	Whitechurch	Police Barracks	Belfast Method-ist College	Stratford, Salway Place
Acton Green	Bardett Road	Edgware Road	Kentish Town	Monument	South Bromley	Whitechapel	Eastney	Battersea, St. Mary's Church	Sutton
Aldersgate-street	Barscough	Fairbairn	Kilburn	Newcastle-under-Lyme	South Kensington	Whitely	Fleetwood	Cowper Street	Torrington
Algate	Burton	Farringdon Street	Kings Cross	New Cross	Speke	Willenhall	Fulwood	Clapham	Upton Cross
Althorp Park	Bury	Fenchurch Street	King William Street	Newport	Spring Grove	Bridge	Halifax	Colchester	Wandsworth
Altrincham	Borough Road	Finchley Road	Langley Green	Newton Heath	Stechford	Willesden	Hamilton, Glasgow	Forest Gate	
Ash Street,	Canonbury	Finsbury	Latimer Road	North Brentford	Stepney	Wood Green	Hulme	Hanway Place	
Stockport	Camden Road	Forest Gate	Lea Bridge	North Bridge	Stoke	Wormwood	Knightsbridge	Harrow	
Birmingham,	Chalk Farm	Forest Road	Leman Street	Northampton	Stourbridge	Scrubs	Leicester, Glen Parva	Haverstock Hill	
New Street	Charing Cross	Level Crossing	Leyland	(Castle Station)	Stratford	Worsley	Manchester	Orphan Working School	
Banbury	Cheddington	Fulham	Leyton	Nottingham	Stretford	Wolverhampton	Newbridge	Jamaica Level	
Barnsley	Cheetham Hill	Geedley	Leytonstone	Old Ford	Sudbury	Wolverton	Newcastle-on-Tyne	Leyton, Grammar School	
Batley	Chequerbent	Gloucester Road	Limehouse	Oldham (Mumps)	Sutton Coldfield		Normanton	Leyton, Church Road	
Bedminster	Clayton	Gower Street	Lincoln	Paddington	Ashton-under-Lyne		Northampton	Newhall	
Bescot Junction	Clifton	Gratham	Little Ealing	Parsons Green	Barnet		Norwich	North Bow	
Birmingham	Clietheroe	Greenwich	Liverpool Road	Penzance	Portsmouth		Portsmouth	Old Ford	
Bishopsgate	Crews	Hackney	Manchester	Pickle Bridge	Tring		Preston	Poplar, Byron & Bright Streets	
Blackfriars	Crooked Billet	Haggerston	Hammersmith	Plaistow	Tower of London		Regent's Park	Southsea, Rubery Asylum	
Blackfriars Bridge	Cross Lane	Heaton Park	Leamington	Plymouth	Tring		Salford	Netley Hospital	
Blake Street, Sutton	Crumpsall	Hereford, Barr's Court	Liverpool Street	Poplar	Tynemouth		Shorncliffe	Peterborough	
Coldfield	Cullercoates	Highbury	Llandudno	Portsmouth	Upton Park		Trim	Southsea, Omega Street	
Blaydon-on-Tyne	Cannon Street	Highdram Road, Wandsworth	Londoun Road	Prestwich	Victoria		Winchester		
Bletchley	Daubhill	Hollinwood	Ludgate Hill	Radcliffe	Walham Green		Woolwich		
Bolton	Daybrook	Holhead	Mark Lane	Road	Walsall		Wrexham		
Bolts Bridge	Denholme	Homerton	Manchester, Exchange	Salisbury Road	Waterloo, Liverpool				
Bombay, India	Derby	Horley	Manchester, Exchange	Seething Lane	Weaste				
Bow	Droylesden	Hounslow	Manchester, Exchange	Shedwell	Werneth, Oldham				
Bowdon Central	Drighlington	racks	Manchester, Exchange	Shoreditch	Westbourne				
Brick Lane	Dudley Port	Keighley	Mildmay Park	Snow Hill, Birmingham	West End Lane				
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Broadfield	Ealing Common								
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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1762.

FRIDAY, OCTOBER 12, 1888.

## QUALITY OF BUILDING MATERIALS.

VERY few among the profession are masters of the qualities of building materials. We have highly educated architects—many experienced in building operations generally—who have scarcely mastered the technicalities of some of the trades. Under the two words, "work and materials," we can sum up the general deficiencies of architects. They may be expert as designers, adepts in construction and general business, yet they somehow fall short in such duties as specifying the right quality of stone or timber, or in preparing details for any iron construction. We have known architects who generally hand over these matters to the surveyor, who is employed to take off the quantities, and even go to tradesmen to give them a hint as to the sort of work they require, or to advise on materials. "Never be above learning of others" is a sound maxim; but the advice so obtained may be bought dearly, or may lead to unpleasant consequences in the settling up of the accounts. Then Mr. Quarryman's advice may prove rather troublesome, or it may even be discovered that a better stone might have been selected for the building. When so many illustrious architects have erred in their judgment as to the most durable stone for great buildings, we cannot be surprised if we find the ordinary practitioner at a loss to know what stone to specify for a particular work. Although few tradesmen, manufacturers, or merchants can afford to give unprejudiced advice, yet it is often safer to seek their opinion than to rely upon one's unaided judgment or knowledge. A respectable merchant or manufacturer, whatever his preferences, would hesitate to risk his reputation by recommending anything that would reflect discredit upon his name or character; and a young architect may, without danger, place full confidence in the goods supplied from such a source.

The qualities of timber form one of the most perplexing of the architect's requirements, from the fact that the goods in the market are of so many descriptions, and few are skilled in the trade marks or shipments. The usual specification description is too vague to insure a good class of timber, or what is quite as usual, the goods described are not to be obtained in the market at any price. We have here a habit, as we have pointed out some time since, which has grown into a stereotyped phrase, or, as a correspondent has pointed out in a recent number, a "servile copy of specifications written a century earlier than the present one." The consequence of repeating such obsolete phrases is, of course, obvious. The contractor selects his own timber or deals, and the architect is none the wiser. How many specifications include a clause to the effect that "no American or Swedish fir is to be used on any part of the building," the result of which, if implicitly obeyed, as it seldom is, is to exclude Gefle, Soderham, or other equal qualities of the best Baltic deal, especially those qualities marked "mixed" 3rd and 4th. The term "mixed" is that in use only by the shipper, and include the first and second qualities. The value of some of the Swedish goods is recognised by all judges of timber, and for this reason—balks of Russian timber are cut into deals of all one kind, which contain the hearts and shaky parts, whereas the Swedish balk is converted into deals of varying qualities. For the coarser use of carpentry and exposed situa-

tion, Swedish deals answer as well, if not better, than the dearer qualities of Prussian deals. Col. Seddon remarks:—"Swedish 2½ in. and 2 in. deals of good quality are to be preferred to 3 in., since they are all cut from the sound outer wood, although, being a novelty in the market, and their value not understood, they are cheaper." Mr. W. Stevenson, in his reply to a correspondent in our "Intercommunication Column," has very clearly stated the case. He says, speaking of Swedish firwood, joiners' work, "with any amount of exposure upon it, providing the section be not large as in the bottom and middle rails of doors, might be of mixed or 'thirds' Swedish fir, of Gefle, Soderham, or equal shipments, and all internal joinery to be of St. Petersburg or White Sea firwood, of best or second quality." A great deal of ignorance prevails among the profession as to yellow deals. A common clause in specification states that "all the floors and joiner's work to be of the best yellow Christiania deals"; but, as pointed out by Mr. Stevenson, this class of goods does not practically exist, if it can be obtained in the market. The description was a true one half a century ago, but the character of the deals are now very different. For floors and joinery the best deals are probably those that are shipped from Petersburg, Onega, and Archangel, having a clean grain and good wearing surface. It is necessary, however, to specify the best qualities. In these matters the modern specification is in need of a complete revision: writers are constantly repeating the old formulæ without any thought of the change of the market and the better qualities that are used. One of the constantly recurring errors is specifying timber for carpentry purposes, quite irrespective of scantlings, of a class that does not exist. After specifying that the timber is to be of the best Dantzic, Memel, or Riga fir, the clause goes on: "the timber to be cut die square, and to be free from sap, shakes, large and loose knots, and other defects." It would be far better, as pointed out by our correspondent, to specify that all timbers larger than 11 in. by 4 in. are to be cut from medium quality Dantzic, Memel, or Riga fir, having a fair average of sap or knots, and all those of less scantling to be of "fourths" quality; Swedish fir of good shipments, all cross-grained and sappy wood to be rejected, or to select a certain quality or shipment and see that the proper mark is on the logs. The inspection necessary to insure attention need not be irksome; the specification would describe the particular shipment and the marks on the end of the timber, no inferior quality being accepted. Hence a safe rule could be followed. Having by experience found a good quality of timber for a particular use, distinguish it by stating whose shipment it is, or the marks or letters used to denote the quality. It is surely worth while to master the hieroglyphical marks and devices, if by so doing the architect can be certain to obtain the quality he desires, which, though not the best, may be quite good enough for the particular purpose required, and would not give the builder unnecessary trouble by seeking for what cannot be obtained, or allow him the opportunity of evading altogether the clause. The builder gains confidence and presumption by wrongly-described goods, or those that cannot be had, and substitutes something far inferior, believing that the architect is not a judge of the material. If those who write specifications were moderate in their demands, yet precise, they would earn more respectful compliance than they now do. Some well-known timber, such as Dickson's, shipped to London, is not easily obtained at other ports; hence, as our correspondent suggests, another of equal quality ought to be given as an alternative. Again, of the four qualities of Memel and Dantzic, known as

the "Crown," 1st or "best middling," 2nd or "good middling," 3rd or "common middling," it would be vague to specify Memel of the first quality when the shipper's goods were unknown, as one's "good middling" may be equal to another shipper's "best." We cannot expect to learn anything about qualities of timber by observing rules, as nothing short of experience gained in the workshop or at the shipper's yard can give one the necessary knowledge. The marks and brands are not always reliable, as they frequently denote private owner's initials or devices. Memel and Dantzic have the indented crown and the numbers I, II, III, inscribed to mark the qualities, though these are often varied. The best specifier of materials like timber will probably learn in time the importance of being precise in defining qualities that are in the market, and in selecting those which meet the object, and of a kind appropriate and suitable to it.

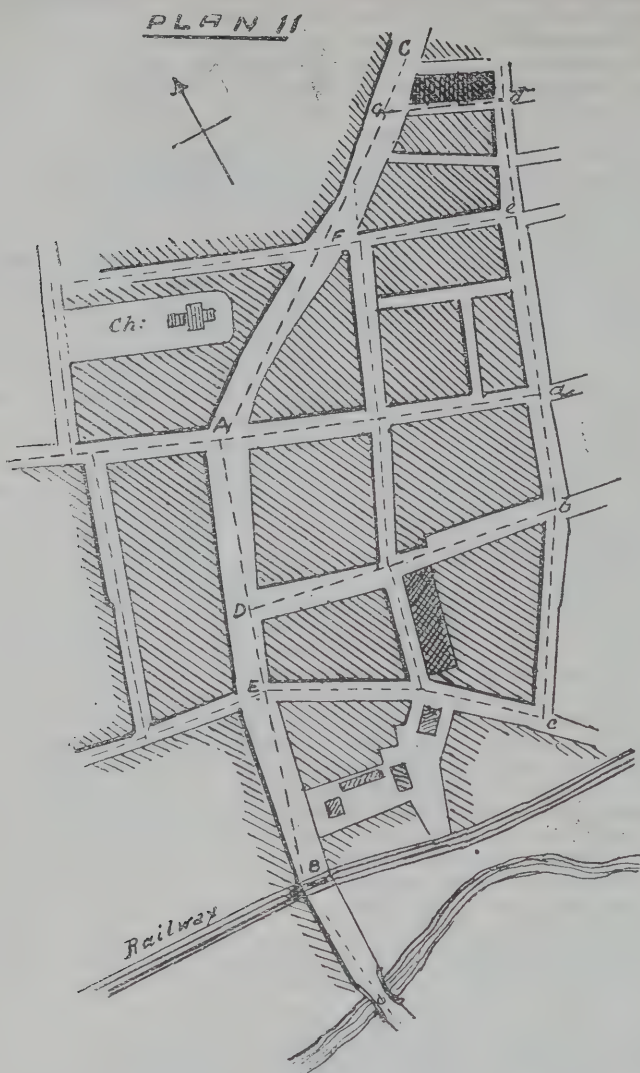
Till we find this critical and precise knowledge of qualities, the routine writer of specifications will continue to use the superlative degree of comparison in the choice of adjectives, overlooking the fact that a medium quality will answer the purpose often better than the best. It is impossible, as every practical man knows, to get wood entirely free from sap and knots; all that is needed is to select a fair average sample. To specify for more is often to fall into the hands of designing contractors, who, taking advantage of the unpractical demand of the specification, select the inferior qualities of timber without the slightest compunction.

## LAND SURVEYING.—IX.

### TOWN SURVEYS WITH THE THEODOLITE.

WE may now consider another class of surveys in which the obstructions offered by blocks of buildings and houses allow of only certain lines to be measured, and certain angles to be taken. The higher art of surveying is here called into requisition. Not only have different levels to be considered, but it may be only possible to chain a base line in a convenient part of a town, and from thence to construct triangles by measuring angles to distant objects at the extreme ends of the base line. In our last article we took the case of a large country estate, through which it was not convenient to run many cross or tie lines. The boundaries were taken by running lines from certain fixed stations round the estate, and taking angles where possible to one central object, so as to form a series of large triangles, each side of the polygon forming a base, their several directions being determined by referring to the meridian. Such a plan of procedure could be adopted in the survey of a town, though it is not always possible to chain the boundaries, owing to blocks of buildings intercepting the chain, and there may be no centre object readily discernible to which angles can be taken. (1) We may imagine a small town through which a street runs at some angle with the meridian. The street may be tolerably level and straight. There may be certain objects, such as lofty buildings, spires, or chimneys, on either side, which can be observed at particular points of the said street. A base line can be chained for a considerable distance along the street. At its extremities, or at particular points, a church tower, or the angle of a lofty building, can be seen, lines joining which, with the base line, may make well conditioned triangles. Having carefully measured such a base along the street, we can set up the theodolite at the ends, and take the angles to the structure, thus obtaining three elements of a triangle which can be calculated or plotted. On the other side of the street a triangle can also be determined in a like manner by reference to another object at some distance. It will be obvious in this case that we have a





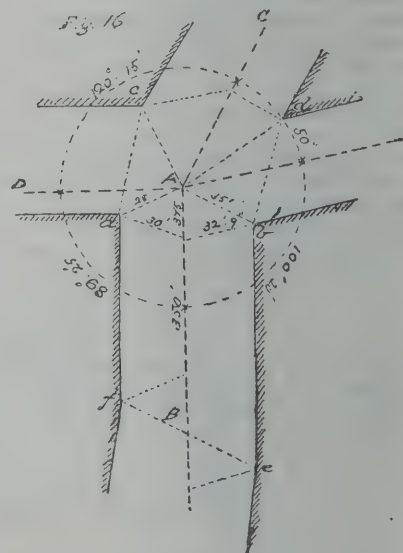
common base line to two triangles, which together will form a quadrilateral figure with sides of different lengths. (2) There may be two objects sighted instead of one on each side from the same points of the base line, in which case there will be four intersecting triangles. Within these triangles the smaller streets or blocks of houses can be filled in with approximate accuracy. Generally, it is possible to measure more than one base line. A cross or branch street may run from one end or station of the main street in another direction to the same object or building; the angle between them can be measured with accuracy. In this case we should have two sides and the contained angle of a triangle, which can be plotted with great correctness. Other lines can be measured similarly through cross streets, which may become tie-lines or other bases of smaller triangles. (3) Or we can imagine another example. The sides of a large triangle that can be laid down can be made bases in turn of another set of triangles; in this way a system of triangulation may be extended to cover a large area or town. (4) Lofty objects may sometimes be absent. There are towns where the blocks of buildings preclude any sight to a distant object, and where the streets run more or less irregularly at different angles. As this case is one of the simplest, and will generally be such as will occur to the surveyor in connection with drainage and other works, we may consider it first. Moreover, the readiness with which large scale Ordnance Maps of towns of 25 in. to the mile can be obtained, renders it seldom necessary to make extensive surveys by triangulation. We may take a portion of a large town (see our plan) in which there is a main street of slight curvature and several parallel and cross streets on both sides, form-

ing more or less regular blocks. We select a junction of the main and cross streets, from which long lines can be sighted, and fix a station thereon. A chain line AB is then run through the main street to some point or object, such as the corner of a house or lamp-pillar, or some fixed mark that can be noted, which line will form the base line for other measurements. Its direction with reference to the magnetic meridian should be taken. From A other lines are sighted to points *a*, *f*, *F*, and *B*, and their angles measured by the theodolite. The lines are carefully measured by the chain, offsets being taken to all the house fronts, corners of streets, and bends. If a detailed plan of each house is contemplated, the frontages should be taken and noted, and the depths of buildings measured, with particulars of back premises, though this filling-in of the process will be better left till the main blocks have been surveyed and plotted. In chaining the lines through the streets, or in fixing upon stations, the surveyor must note if they are convenient for taking the cross or intersecting lines running to the right or left. When the line *Aa* is measured, fix a point where the minor street *FK* intersects, and angles can be taken of its direction. Similarly other cross lines are taken, and their angles measured at points in the plan marked.

The plotting can be correctly performed by observing the same order as in laying down the lines. Lines *AB* and *AF* should be first drawn in their proper direction with the meridian by using the chain scale and protractor, the latter being placed at the point *A*, and the angles carefully pricked off of *F A f*, *F A a*, *a A B*. These angles being determined, cross lines are drawn indefinitely through the points, thus fixing the direction of the cross street *f A a*, also *A F*. It is next

desirable to plot the outline of the main block of houses and streets comprised within the streets *Aa*, *ac*, *c E*, and the main street. This is done by laying off the distance *Aa* on the line previously drawn by scale. From *a* take distance *ac* on scale, and describe an arc by beam compass. Then take the distance on scale of *E c* as radius, and cut arc by another, which will give the point by intersection. By taking the distances *D b* and *b a*, it will be seen if the work is correct. The intermediate street *FK* can be drawn in by setting off its distance at both ends from *A* and *E*. The large block comprised between lines *Aa* and *G d* can also be fixed by intersection from stations *A*, *G*, and *a*. The angle taken at *A* will fix the diverging street *A F G*. Angles taken at *D* and *E*, or at *a* and *c*, will be useful. The direction of its railway can be determined by taking angles at *B*, and the curvature of the river can be surveyed and plotted by offsets taken from the railway if straight.

In every case the first thing is to draw the base line and plot any large triangular area by means of the chain scale and beam compasses, so as to fix the position of other dependent stations. The angles can be checked by the protractor, and if they are



found to agree with the notes the triangle is correct; if not, either the chaining or the angles must be verified. Tie or proof lines are afforded by the lines measured along the minor streets, and these should in all cases be taken, and their intersections with the main lines noted carefully. Tie lines, though very useful if taken with care, may be very misleading if the points where they intersect with the other lines are not noted with precision. For instance, a triangle is a figure which can be accurately determined if its three sides are correctly taken, but only on that condition. Now a "tie" may be measured from side to side as a check, but may be found when laid down to be several links too long or too short for the sides as plotted, and it will be difficult to determine which line can be depended on, the side or the "tie." The work has to be re-surveyed. The error is probably found to be that the distances of the tie line from the point of triangle have not been carefully fixed. We prefer to take one angle by an instrument or to run ties across two of the angles of the triangle; or, better still, to take a tie from one of the angles to the centre of opposite side. Blocks of houses between streets are often parallelograms or trapezoids. These figures can be tested only by diagonals or angles at two of the corners. In the field book for town surveys, sketches of building frontages, the back premises, and yards ought to accompany the entries. Returning to our plan; the block



A *abcKE* is a six-sided figure, and the angles being taken at each point, the sum of all the interior angles must be equal to twice the number of right angles that the figure has sides, lessened by four right angles—a proof of the correctness of the angles measured. The last line should also close at *E*, and the line *bD* will become a further check. Again, if the angle *FAB*, formed by the directions of the two base lines, be accurately taken and plotted, the distances on the line *FK* of the three cross streets ought to fix their directions, but further check can be found by taking angles at *D* and *E*. Every surveyor will use his own judgment in deciding which angles are the best to be taken; but as a general rule those angles should be taken which determine the directions of the longest lines, such as the junction of streets at the point *A* in our plan.

#### DETAILS OF TOWN SURVEYING.

In the survey we have been considering we have imagined the town pretty much on a level; but the surveyor has often to encounter considerable irregularities of surface. Thus, the cross streets in our plan may run rapidly down to the sea level, as in many watering places, requiring in the chaining of the lengths a correction to be made for a chain length for every degree of inclination of the street. For this purpose a clinometer and a table of multipliers will enable the surveyor to make the correction as he proceeds by placing the arrow forward the distance given in the table, or a link or so at the end of every chain, obviating the trouble of having to calculate the reduction afterwards before the work is plotted. In fixing upon a station for the theodolite, some judgment is required in selecting a spot from which the longest lines can be ranged. Maps for this purpose are of no use, except when the datum levels are marked on them. If possible, a high station is an advantage, as it allows the surveyor to turn his instrument to any objects in the area the positions of which he wishes to fix.

When a base line can be run through a main street from end to end, the opportunity should be embraced, as the line may be made the basis for all angles on the right and left. For entering the angles measured, some surveyors use a plan of each street to a large scale, showing the lines of frontages and position of cross streets, and the angles are entered near each, including the supplements of the angles, one under the other, as—

139° 45'
40 15
180 0

Thus both portions of the half-circle being taken from the base line, the readings are checked. If there are other objects to which angles have been taken the observations are noted one beneath the other, with the object written to each, so that there can be no mistake at any future day. We prefer to enter the angles on circles described at the crossings of the streets on the plan itself—a course which avoids any possibility of error. An angle to a distant object out of the plan can be defined by a line in its direction with the name of object entered at end of line. Particular attention is also required to fix the corners of the streets at each crossing, for which purpose a tape divided into feet and inches is necessary. Indeed, for large-scale surveys the 100ft. chain is recommended in preference to the ordinary chain. For example, in diagram the corners of street *a* and *b* are taken at a point in the chain line *BA*, 350ft. from *B* offsets are taken by the tape to *a* and *b*, to *a* the distance is 30ft., to *b* 32ft. 9in. From *A* the station 375ft. *A*, *a* is taken 28ft., and *A* *b* 35ft. Measure also *Ac* and *Ad*, and at distance 52ft. from *A* take the other offsets to corners *c* and *d*. The distances between corners *a* and *c* and *b* and *d*

should also be taken. These measurements will fix the corners of the streets. Angles in the line of the street, as at *e* and *f*, can be determined also by measurements in the directions noted by dotted lines. Lamp pillars and corners of buildings are to be preferred in ranging the chain lines, as they are fixed points and can be marked on the plan. As we have before observed, an angle between two lines can be taken either by measuring the angle between them independently of the magnetic meridian or from it. In town surveying we prefer the first method, as it is not open to the inaccuracy caused by attractions of the needle in the vicinity of iron railings, lamp-pillars, and rain-water pipes. Thus having fixed upon a station *A*, where the two base lines *AB*, *AC* meet, lines are set out from it through the streets *D* and *E*, and the angles are taken independently between the two main lines *AB*, *AC*, also the angles *CAE* and *EAB*. The instrument is then turned to take the two opposite angles *BAD* and *DAC*. The separate angles can be proved by taking their sum, which, of course, ought to be equal to 360°. If only two angles are taken from a straight base line, they will, of course, be equal together to 180°. In the survey of irregular streets in which there are many bends or angles, the principle adopted in traversing can be used. The same system is applicable in the survey of towns or blocks of houses, for drainage and other purposes, the lines being run as we have described on p. 364. An example of this we shall give in our next article.

#### SOME ARCHITECTURAL NOTES FROM FRANCE.

(By the Author of "London Churches—Ancient and Modern.")

(Concluded from page 424.)

CHARTRES—PARIS—RHEIMS—LAON—SOISSONS—CAMBRAI—LILLE—CALAIS.

THE day of our visit to Chartres, Aug. 15, was the Feast of the Assumption, and one on which the resources of the vast fabric in music and ritual would be displayed to their greatest advantage. Nor were we disappointed; but as this paper must deal exclusively with the architectural glories of Chartres, all mention of the services it was our privilege to attend must be avoided, much as we should like to attempt their description.

Chartres Cathedral is beyond question the noblest in France. Until we had seen it we thought Amiens the *ne plus ultra* of Continental hugeness of dimension. Chartres has all the beauties of Amiens without its stilted character, and must, therefore, be considered the more pleasing of the two buildings, neither of which can be compared, Chartres being First and Amiens Middle-Pointed.

The gigantic dimensions of Chartres may be gathered from the current statement that the height of the apex of the roof at the western façade is the same as that to the summit of the towers of York Minster, an assertion which, whether true or not, sufficiently indicates the extraordinary altitude of Chartres Cathedral. The mass of the fabric is the Earliest Pointed—indeed, many of the subsidiary portions still retain the round arch. This is especially observable in the arcades in the towers and the arches helping to support the three tiers of flying buttresses. Throughout, the square abacus prevails. The only Late additions we observed were the elegant N.W. steeple, a small chapel on the south side of the nave, and an elevated one, admission to which is gained by a flight of steps behind the Lady altar. All these belong to the Flamboyant age. A volume might be written in exposition of the sculpture enriching the Western or Porte Royale, and the deeply-projecting porches of the transepts, but space forbids. Passing into the interior we were deeply impressed, not only with its great width, consequent upon the inclusion of the nave and aisles of a former church in the nave of the present one, but with the deep dim light occasioned by the

old stained glass with which almost every window is filled.

To the first impression of wonder succeeds enthusiastic admiration, as one by one the beauties of this vast pile unfold themselves, which attained its acme when we passed round the choir aisles and stood before that world-famed series of sculptures—a sacred history in stone—inclosing the "chorus" and sanctuary. It is almost needless to say that we spent every available moment in this magnificent fabric, studying its treasures of old glass and carving, in the intervals between the services, which were a Parish Mass at 9, High Mass at 11, followed by the chapter offices; Vespers at 2.30, and a procession in the town, followed by a sermon and Compline. The only portion of the structure which failed to give us unalloyed pleasure was the choir, which, under the episcopate of Bishop Fleury (1746–89), was sadly Italianised. So heavily was the hand of the Classicist laid upon it, that the original form of the piers, capitals, &c., has entirely disappeared. The sculpture of the great north and south transept portals is most delicate and refined, the figures affording valuable illustrations of early vestments. Especially noticeable are the patterns on the ends of the stoles, maniples, and apparels. All these details are very minutely given.

The cathedral being closed rather early, we spent the rest of the evening in visiting the two fine ark-like churches of St. Pierre and St. Aignan, both of which orientate, and, seen from the lower parts of the city, group well with the cathedral. St. Pierre, the finer and much older of the two, boasts a goodly supply of old painted glass. The nave bears some resemblance to the cathedral in its clerestory, but is considerably anterior to it; neither church has a steeple. St. Pierre was intended to have one at the west end, but it seems never to have been finished. It is in the apse, however, that the beauty of St. Pierre, Chartres, resides. It is very remarkable, and Middle Pointed. The triforium which is carried round it is shallow, but lofty, and the large exterior windows are apparent, as at St. Ouen, Rouen, and elsewhere. All these are filled with glass, as are the thickly-set lancets of the clerestory. It is needless to say that the effect of this scarcely broken wall of painted glass is most gorgeous. Of the other Chartres church, St. Aignan, there is little to say beyond that it is a curious attempt to reproduce a First Pointed church during the Late Gothic period. Its interior, most gorgeously polychromed, has an open coved roof, of a type employed by Mr. Burges in his cathedrals at Cork and Brisbane, and in his noble, but as yet incomplete, church of St. Faith, Stoke Newington.

We left Chartres with a pang of regret early in the morning of the 16th August, and about ten o'clock found ourselves in the heart of Paris. It is almost needless to say that, after securing rooms at the comfortable—we had almost said luxurious—Hotel de Lille et d'Albion, our first visit was to Notre Dame, whose western towers our own Westminster Abbey but requires to render its exterior one of the most beautiful in Christendom. As a monument, Notre Dame at Paris can hardly be ranked among the first churches of France: Rheims, Chartres, and Amiens rival it in the beauty and grandeur of the whole, as do the cathedrals of Coutances, Rouen, Bayeux, and Bourges in the perfection of certain portions. But in compensation the Metropolitan church of Paris has a right to be counted in the first class of the masterpieces of French architecture, by its noble simplicity, by the severe and majestic beauty of its west front, and, above all, by that so rare harmony which reigns in that vast edifice, to which little or no subsequent addition after the 14th century has been made to alter its sublime unity. From the year 1699 to the Restoration of the Monarchy in 1815 a series of vandalisms were committed at Notre Dame, leaving it, externally, little more than a heap of ruins. One of the most atrocious was the removal, in 1771, of the central pillar of the west door in order to leave a passage at the time of external processions for the stiff buckram canopies, such as the sacerdotal ornaments of France were until the revival of a purer taste, instead of being, as in Italy, of flexible stuffs. Happily, in 1845, by the erection of a new and suitable sacristy



that series of true restorations began under M<sup>r</sup>. Viollet-le-Duc and Lassus, which have tended to bring back to Notre Dame some traces of its former splendour. It is not too much to say that for deep religious solemnity the interior of Notre Dame de Paris is unequalled—by Chartres excepted. Towards this effect the two clear aisles running round the entire church materially contribute. In its simple grandeur, the only colouring to which is lent by the painted glass, the interior of Notre Dame now presents one of the most magnificent specimens of the Early Gothic in France. From Notre Dame, we bent our steps towards the Saint Chapelle—a fairy church of glowing and translucent colour. It sets at defiance all rules of colourisation, all architectural proportion of wall to glass in its unique resplendence. The space of window is so great, the colour of the walls, where they are of stone and not of glass, so glowing, that all disparity of material is forgotten, and the whole structure glows a crystal pile of every rainbow hue. The vast proportion of diaphanous colour entirely removes that heaviness which would have resulted from a church in which colour reigned supreme, and where the window superficies was less—St. Germain des Près, for example, or Pugin's Church at Chislehurst. We paid visits to the majority of the Paris churches; but, as they are so well known, have sent but few notes upon them. We admired the gorgeous interior of Paris' only Romanesque church, St. Germain des Près; the Flamboyant elegance of St. Severin; that curious connecting link between Gothic and Renaissance—St. Eustache; the cold, Classical Madeleine, and the rococo St. Roch. Imposing is the huge Byzantine church of St. Augustin, whose dome closes the vista up the Boulevard Malesherbes, and which seems to crush the west front, devoid, as it is, of aisles. St. Clothilde, the largest modern Gothic church in Paris, is externally cold and unsatisfactory, its two open-work spires having neither the light effect of the open spires at Ulm, Cologne, and Fribourg, nor the solid grandeur of Salisbury, Lichfield, or Grantham; but the interior of St. Clothilde, entering, as we did, at dusk, had a remarkably minster-like appearance. The reliefs from the Lives of St. Clothilde and St. Valère, carved upon the parcloises of the choir and the fine series of "stations" by Pradier, combine Christian sentiment of the finest description with a style of execution worthy of the purest Greek age, and with Flandrin's magnificent procession of saints in St. Vincent de Paul form examples of Christian art in their different departments. St. Clothilde contains a large quantity of painted glass, but being the work of several artists, has an effect which, as is usual under such circumstances, is unsatisfactory.

Early on the morning of Saturday, Aug. 18, we left Paris for Rheims, the journey thither being most interesting, embracing fine views of the cathedral at Meaux, lovely tracts of vine-clad slopes by the Marne, and thickly-set villages, all containing churches of some architectural merit. In this district, as in that between Lisieux and Coutances, the "Saddle-back" type of tower seemed prevalent. Arrived at Rheims, after an excellent déjeuner at the "Maison Rouge," we repaired to the cathedral, in which, with the exception of a visit to the Romanesque St. Remi, we spent almost every available minute of our time. Rheims finds its way more directly to the hearts of us Englishmen by reason of the close likeness it bears in its *tout ensemble* to our own noble Westminster—nowhere more apparent than in the apse—while in its treasures of painted glass, unfortunately confined to the clerestory, it falls in interest but little below Chartres. Says Mr. Fergusson, in his "Architecture": "Nothing can exceed the simple beauty and perfection of the arrangement of the plan, as well as of the general harmony of all the parts. The proportion, both in width and height, of the side aisles to the central nave, and the absence of side chapels, and of any subsequent additions, render the nave one of the most perfect in France." The nave piers, although finely proportioned, have not the elegance of those at Westminster. They consist of four slender shafts disposed around a thick cylinder, and have their capitals, which are of immense size, carved with foliage closely copied from nature, and rather startlingly

coloured with yellow ochre. The painting of the nave vault, a cerulean hue spangled with stars, shows evident signs of peeling off. As in all French cathedrals we had seen—Notre Dame excepted—the high altar at Rheims is Classical, or rather pseudo-Classical; but its ornaments, crucifix, candlesticks, &c., given at the Coronation of Charles X., are very fine and massive. The high altar stands under the crossing, the choir proper being quite unstalled, but furnished with a secondary altar. As at Amiens, Beauvais, Paris, and elsewhere, the eastern radiating chapels glow with colour. The central one is very richly coloured, both as regards mural and glass decoration—too dark, in fact; but in the left chapel the glass is unusually light, a very pale green, if memory serves aright, being the prevailing tone. The Lady-chapel, occupying the eastern aisle of the north transept, has been lately polychromatised, and is at present somewhat glaring. We should have remarked that the wall space below the nave aisle windows is hung with old tapestry, thus atoning in a measure for the want of painted glass in this part of the cathedral.

An hour was profitably spent in examining the noble Romanesque church of St. Remi, with its Renaissance screens round the retro-choir, inclosing the also Renaissance shrine of the patron. At the time of the Revolution Rheims possessed two churches, St. Remigius and St. Nicasius, besides the cathedral. The citizens were called upon by the National Assembly to decide which should be saved, and they fixed upon St. Remigius, from veneration to the patron, though much earlier and ruder; and thus St. Nicasius, the "pearl of the city," was doomed to destruction.

The setting sun was streaming through the two glorious western roses when we returned to the cathedral to pay it a second enraptured visit, throwing gorgeous rainbow hues on the pillars and floor. At 6 o'clock we left for Laon, admiring the matchless west front, on which the sun was shining in all his evening glory. A pleasant run of an hour, through country quite Kentish in its character, brought us to Laon, whose two great architectural attractions—the cathedral and church of St. Martin—are situated at the two extremities of the long, narrow ridge on which the city stands, and which, towards the east, falls precipitously on three sides almost from the very walls of the cathedral down to the broad, vast plain, stretching as far as eye can see. It is almost needless to say that for situation Laon Cathedral is unrivalled in France, and that from all sides its magnificent cluster of steeples form a group upon which it is impossible to descant too enthusiastically. Space, however, is limited, and we must condense as much as possible. In the opinion of one of our greatest modern architects—now, alas! no more—"Laon Cathedral is one of the most valuable historical monuments France possesses, for the completeness of its plan, the short time which seems to have elapsed between its commencement and completion, and the almost total absence of additions or alterations in later styles." Throughout, the work is First Pointed, except the chapels, which open out of the nave and aisles. It consists of an eleven-bayed nave, with two western steeples, out of whose open pinnacle-squins figures of oxen look out; transepts, each flanked by one finished and one unfinished tower; a low, central lantern; and a ten-bayed choir, having the unusual feature of a square end, but one in which the French architects rarely excelled, as the one at Laon testifies, its effect both externally and internally being weak. The fenestration consists of three lancets and a rose above, recalling Durham.

Beginning at the west end; under the stone gallery or tribune, stands a kind of inner porch to the west door—a baldachin-like erection of stone on slender shafts; the main columns of the nave are generally plain cylinders, with very large capitals, from which the groining ribs spring. Some of the piers have slender attached shafts—the effect of these is most elegant. Then the fourfold division in height is very striking both out and inside, consequent upon the secondary triforium, so that there are three heights of windows, belonging to aisle, triforium, and clerestory. The manner in which the chapels open out of the aisles is very noteworthy, the original lancets having simply been unglazed, and the wall space below cut away. Middle Pointed windows of two wide

trefoiled lights serve for these chapels. The fenestration of the transepts differs: the northern one has a very grand early rose, but which is unfortunately quite concealed by the huge Renaissance organ-case; far better would it have been had the organ been placed in the opposite transept, which has only a somewhat poor but large Late Middle Pointed window. As at St. Etienne, Caen; Boscheville (near Rouen), Southwell, and Winchester, the transepts terminate in tribunes—i.e., a gallery on two stone arches. Scaffolding betokening that restorations are still in progress disfigures the south transept and western part of the choir, while the south aisle of the nave, with its beautiful groined south-west chapel, is boarded off. The small eastern apsidal chapels (one above the other) are peculiar features of the transepts at Laon. The choir, separated from the rest of the church by a lofty light iron grille of the last century, is very spacious; but as Laon is not now the seat of the bishop, the episcopal throne is wanting. Soissons is the bishop's see, and with it are united, besides Laon, Noyon and Senlis. Modern Gothic grilles, painted drab, separate the choir from its aisles, in whose chapels we saw many beautiful fragments of sculptured detail, removed during the restorations. Several of these chapels, all of which (including those in the nave) are screened off from the aisles by elegant Renaissance work, exhibit traces of mural colorisation. Behind the high altar is a Classical altar-piece of wood; on the occasion of our visit the doors of this were open, displaying a magnificent piece of jewel-work, resembling a "Host," in the centre of which is placed a Mediaeval head of the Saviour, quite Byzantine in its character, and bearing date 1249.

Our notes on the architectural glories of Laon Cathedral have swelled to such an extent that those on the remaining buildings we saw during our tour must be brief. The churches of St. Martin and at Vaux sous Laon are both curious and interesting structures, possessing the square-ended termination. St. Martin's has a fine Teutonic-looking nave, somewhat similar to that at Spire, on the Rhine—a Middle Pointed west front rich in mutilated sculpture, and two towers, lower part Early, and upper part very poor Late Pointed, giving one the idea of their having been finished in a hurry, or from lack of sufficient means. In the choir and transepts we noticed a great quantity of finely-carved wainscoting. At the bottom of the hill on the east lies the small village church of Vaux with its rude Romanesque nave and loftier chancel very similar in detail to the cathedral. The plan is cruciform, with a low square central tower and pyramidal slate capping.

Having spent a remarkably enjoyable Sunday in Laon, we passed the afternoon of Monday, Aug. 20, at Soissons, the distant view of which city is rendered imposing not only by its cathedral, but by the west front and spires of the ruined abbey of St. Jean des Vignes. Although by no means vast, Soissons Cathedral can fairly take a very high rank among French churches on account of its just proportions. One of the most striking features is the apsidal south transept, which at a distance has a somewhat odd appearance owing to the apex of its roof being considerably lower than those of the rest of the church. With it may be compared the apsidally terminated transepts of Noyon and Tournai Cathedrals. A striking contrast is the fenestration of the northern transept at Soissons; the wall is divided into four compartments by mullions, but only the upper portion, divided by two transoms, is glazed, the solid wall being relieved by a delicate colouring. Surmounting the whole is a magnificent rose, which, as well as the upper part of the wall, has fine modern painted glass. This transept forms the Lady-chapel, the altar being surmounted by a beautiful tabernacle, as are two groups on either side—St. Anne and the B.V.M., and St. Joseph with Our Lord. Unfortunately, the east windows of the apse and chapels in the choir are at present denuded of their painted glass. We were, therefore, unable to form a really correct idea of this most elegant choir; brick supplies the place of the glazing. But beyond question, the gem of Soissons Cathedral is its chapter-house, an oblong erection situated almost in a line with the west front, and entered from the



western—the only remaining—walk of the cloisters. Glowing with beautiful modern glass, its window tracery consists of three trefoiled lights running up into the head of the arch. There are three of these on its western and, if memory serves aright, two on its northern side. The doorway opening into the cloister abounds in the most exquisite detail.

Outside, Soissons Cathedral, possessing only one solitary square S.W. tower, somewhat lacks dignity—a *fêche* at the crossing would materially remedy this defect; but there is a great repose about the building which was, perhaps, a relief after the stupendous piles of masonry we had visited. The detail of the porch on the eastern side of the north transept is fine, and it is by this door that the cathedral should be entered, whence one obtains a fine *coup d'œil* of the nave, with its tall cylindrical piers, and their foliated capitals.

Returning to Laon the same evening, we quitted it on the morning of Tuesday, Aug. 21, for Cambrai, where, after passing St. Quentin with its colossal church, which we deeply regretted our inability to visit, we arrived about two in the afternoon. The cathedral at Cambrai is Classical, and quite modern, having been rebuilt in 1859; but Murray's designation of it as "vast" is hardly applicable—we thought it had a squeezed-up appearance. Some additions in a sort of Byzantine style have not tended to improve it, among them being the tower, a consumptive-looking campanile surmounted by a stumpy black spire, sustaining a gilt crown, and a statue, also gilt, of the Blessed Virgin; it is difficult to think how anyone could have conceived such a monstrosity.

Internally, beyond the fine tomb of Fenelon behind the high altar, and a few other monuments of prelates, there is little to interest in Cambrai Cathedral; the stone is very white, and would look all the better for a little mural colourisation. Stained glass, too, is conspicuous by its absence. The general aspect reminds one, on a very small scale, of course, of the choir of our St. Paul's, or of one of the chapels of St. Peter's at Rome, upon which the architect, whoever he was, seems to have modelled Cambrai Cathedral. More picturesque is the also Classical church of St. Gery, with its central dome supported by four enormously lofty Corinthian columns resembling Pompey's Pillar. There is some fine carved woodwork round the apsidal sanctuary, but the gem of the church is the marble organ-loft at the west end, with its delicate sculpture.

From Cambrai we went to Lille, whence, after a pleasant half-hour spent in its fine five-aisled church, whose pillars we fancied furnished Sir G. G. Scott with the model for those in his churches of St. Andrew, Westminster, and St. Mary, Stoke Newington, we caught the 10.25 express for Calais. After looking round the spacious cruciform church, with its home-like Perpendicular windows in the transepts and clerestory, we embarked for Dover, and thence returned home, having spent a holiday which we shall ever afterwards look back upon with the greatest delight.

T. FRANCIS BUMPUS.

#### THE MALASPINA MONUMENT AT SOUTH KENSINGTON MUSEUM.

TO the student of Italian art the mural monument of the famous Spinetta Malaspina, which has just been erected in the Architectural Court, will present some puzzling questions. The label informs us that the tomb has been removed from the Church of San Giovanni in Sacco at Verona, where it was erected in 1536. Spinetta died, as we learn from a now illegible inscription painted on a tablet above the principal figure, in 1352. He took a conspicuous part in the stormy warfare of the early years of the 14th century, and was vanquished and driven from his dominions by Castruccio Castracani about 1320. He implored the assistance of the Florentines, and in spite of their aid and that of the entire Guelph confederation, he failed to regain his territory until after the death of Castruccio in 1328. In his later years it would seem, from his life as given in Litta's "*Famiglie Celebri Italiane*," that he devoted himself to good works, erecting churches and hospitals, notably, in the outskirts of Verona, a church dedicated to St.

John the Baptist, where he was buried. This church was, however, destroyed in the 15th century; but it was rebuilt by members of the Malaspina family on a new site within the walls of the town in 1529.

The monument in its present position is probably placed much lower than the level for which it was designed. It consists of an equestrian statue of the Marquis seated within a tent, the curtains of which are held back by two life-sized soldiers in Roman dress. The tent pole passes up behind the horseman, and supports a winged figure of Victory on a richly-moulded pedestal. The canvas of the tent hangs below the ground level, and against it is represented the rockwork, on which all these figures are standing. Spinetta has on his head the characteristic round cap of the period, and holds a wand in his hand. He wears a semi-classical dress, and his horse is richly caparisoned. The bit, formed of iron, is of great strength, and the horse is a powerfully-built charger. Below these figures is a sarcophagus, projecting boldly from the wall, and supported on two brackets in the form of lions, each holding a shield with the arms of the Malaspina family. The sarcophagus and the supports are of the red Verona marble, and the front is divided by an arcade into five niches. In the centre one is a white marble statue of the Virgin and Child, on whose right are St. Jerome and St. John the Baptist, and on the left St. Matthew and St. Mary Magdalen; these four figures are in *pietra serena*. Between the lions are two marble slabs, the larger one recording the death and virtues of Leonardo Malaspina\* and his son Galeotto†. The smaller one states that the monument having been destroyed by war in 1516, it was ingeniously reconstructed in 1536. The upper part of the tomb, which has little in common with the marble cenotaph, is made of a very friable stucco, with a backing of coarse brickwork. The winged figure appears to have projected so slightly from the wall as to enable the sculptor to paint labels depending from her hands on the wall itself—at least, so we judge from the illustration of this monument given in the eighth volume of Count Litta's work.

The family of Malaspina, or their descendants, sold the desecrated church of San Giovanni, and it is now used as a foundry, and the tomb was purchased some years ago for the Museum, the vendor stipulating that any treasure found in the sarcophagus was to be his property. In transit to this country the stucco work was terribly shattered, and it has needed all the skill of the staff of modellers to reconstruct the monument. The figures in the niches were obtained subsequently from the representatives of the Marquis Malaspini, who had removed them as the only portable property in the church. It was found that the wall against which the tomb was placed had been pierced from the back by an opening made through an adjoining house, so that any treasure it may have contained had already been abstracted.

The problems presented to us by this piece of sculpture are: What was the date of the original monument, and what part of the same was skilfully repaired in 1536? Did the sarcophagus contain the remains of Spinetta, or those of Leonardo? Is the work in its present form an accurate reproduction of the tomb which was destroyed by war (*belloque dirutum*) in 1516? Anyhow, it is strange to find among the plaster representations of the monuments of the Middle Ages the actual tomb of a great Italian warrior, which has here been re-erected after so many vicissitudes.

#### THE LIGHTING OF THE NOTTINGHAM GUILDHALL.

THE above building, which we described a few weeks ago on page 325, was opened on the 27th ult. The whole of the building is lighted by gas, the work having been carried out by Messrs. Strode and Co., of 48, Osna-burgh-street, London. The total number of gas-burners amount to about 1,500. Large horizontal mains are fitted along the basement corridor, from which separate rising mains are taken to the various floors. Each floor is divided into four sections, and each section is controlled

by a valve and by one of Strode's regulators. The whole of the light can thus be maintained at a uniform pressure, and proper combustion and great economy insured. The entrance hall, the courts, and the grand-jury room are brilliantly lighted and well ventilated by Strode's sun-burners. We consider that these burners still hold more than their own for lighting and ventilating large rooms. The chandeliers and brackets throughout the building are made by Messrs. Strode and Co. in bronze to the design of Mr. Hunt, and are massive and exceedingly handsome. The fire mains and hydrants, of which there are sixteen in the building, and the electric bells and underground wires from the fire-brigade station to the various cottages occupied by the men, have also been carried out by Strode and Co.

#### SKETCHES OF DECORATIVE FURNITURE.

WE illustrate a few examples of decorative furniture, wrought ironwork, &c., from Mr. G. Sinclair's galleries in Shaftesbury-avenue. The old carved Mirror Frame is a quaint example of Italian work; but, of course, we do not give it that it may be copied, as the Roccoco character is not to be admired. The Louis Quinze Arm-chair is a good specimen of its kind, quiet, and without that overloading of ornament which in the next three reigns frequently debased the furniture. The Gates are a fine pair; they are of wrought ironwork—German—of the 16th-century period, the vine-leaves and grapes being exceptionally well wrought. They are 4ft. 4½in. wide and 6ft. 7in. high. The Vernis Martin Clock calls for no special remark. We hope in a future number to illustrate a fine old Bookcase taken from an old house at Hampstead, now in Mr. Sinclair's possession.

#### DECORATIVE OBJECTS.

OUR sheet shows a few choice examples of decorative objects. The Italian Clock is of architectural design, with Corinthian pilasters, surmounted by vases at the angles entirely incrustated with lapis lazuli and agate, and mounted with metal gilt. The Mandarin Jar shown next is a very rare example, and is enamelled with Chinese figures, landscapes, and in gold and colours on a white ground, and small medallions in richly-enamelled trellis borders. The Louis XIV. Chandelier is of charming design, with a vase in the centre with arabesque figures in relief, and branches for eight lights, with scrolls and foliage. The Rose-water Ewer is of brown jasper, fluted and carved with foliage, the handle formed of a terminal monster, mounted with metal gilt on a stand supported by four terminal figures of boys, and a large oval-shaped dish with carved flutings, on a metal-gilt stand with four sphinx-like figures. These decorative articles were formerly in the Beckett Denison and Hamilton Palace Collections.

Owing to the unsafe condition of the tower of St. Peter's Church at Irthlingborough, which was a noteworthy feature among the many in the valley of the Nene, and frequently sketched, it had to be taken down last year. Efforts have since been made to ensure the re-building of the tower, as far as possible, on the former lines, numbers of the old stones being marked for that purpose. The interior of the church was restored some ten years ago. The cost of the pulling down and the re-building of the tower is estimated at about £1,800 (without the clock or bells), and of that amount about £300 has been subscribed. The architects are Messrs. Talbot Brown and Fisher, of Wellinborough, and the builder will be Mr. G. Hanson, Wellinborough.

The opening services of the new Wesleyan chapel in St. Catherine's, Lincoln, were held on Thursday last week. The chapel is a semi-Gothic building: the length of the interior is 78ft., and the width 45ft. It has cost £3,200. Mr. Charles Bell, of London, was the architect, and the builders were Messrs. Thompson and Son, of Louth. The large stained-glass window at the west end is the gift of Mr. Sharpley Bainbridge, J.P. It represents scenes in the life of Christ.

A new altar has just been placed in St. Catherine's chapel at Great Berkhamstead parish church. It is of English oak and of 15th-century character. Mr. Harry Hems, of Exeter, has carried out the work from plans by Mr. C. H. Rew, of Berkhamstead.

\* Died 1403.

† Died 1466.



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## ILLUSTRATIONS.

PALAZZO VECCHIO, FLORENCE.—FREE CLASSIC DECORATION, DESIGNED BY H. W. PRATT, F.R.I.B.A., FOR JEFFREY AND CO.—QUADRANGLE, SALISBURY ESTATE, STRAND.—OLD PLASTER HOUSES, MEDMENHAM.—ST. PATRICK'S CHURCH, BAMPTON.—SKETCHES OF DECORATIVE OBJETS D'ART.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## PALAZZO VECCHIO, FLORENCE.

THE world-famed cortile of this palace, by Michelozzi, was illustrated by a double-page plate in BUILDING NEWS for July 6th last, and we now give a bird's-eye view of the Mediaeval exterior overlooking the Piazza del Gran' Duca, with an outline of the country beyond. Its architect was Arnolfo di Cambio, a pupil of Nicola, and its date of erection is given as 1293. The Palazzo was then occupied as the residence of the Gonfaloniere and Priori, or superior magistracy of the Republic, and is now used as Government offices. We furnished some further particulars of the building when the cortile was given.

## "FREE CLASSIC" DECORATION.

A FREE treatment has been adopted in this design for wall-paper, to meet the demand felt for a decoration suited to the requirements of the prevalent style in architecture. A broad, flat decorative effect is obtained by simple means, and in keeping with the characteristic forms of design used in the carved and ornamented work of "Free Classic" buildings. It was designed by Mr. Hampden W. Pratt, F.R.I.B.A., for Messrs. Jeffrey and Co., of Islington, and a dining-room, lately decorated by Mr. Pratt, and hung with this paper, produced a very pleasing effect, a hall and staircase being subsequently carried out in the same style; the colours adopted in both cases were a warm chestnut for the filling, a brown dado, and orange frieze. Messrs. Jeffrey and Co. have produced a series of ten different colourings of this decoration, and also ceiling patterns of similar character. At the Convezione of the Architectural Association, at Westminster Town Hall on Friday last, this decoration was exhibited, and attracted considerable attention.

## SALISBURY ESTATE, STRAND.

THE property known as the Salisbury Estate, Strand, was the freehold estate of the present Marquis of Salisbury, lying between the Strand on the north, the river on the south, and between Carting-lane on the east and the Adelphi on the west. It occupies the site of the old Salisbury House and its gardens; but modern Londoners will better know it as comprising the houses of Cecil and Salisbury-streets, and the low-lying land between the ends of them and the gardens of the Thames Embankment. This lower portion has for many years—in fact, ever since the formation of the Embankment which cut it off from the river—been in a state of dilapidation, and seemed little short of a scandal to those who knew nothing of the difficulties existing of expiring leases and absolute want of direct access to the site. On this portion still stands, but disused, the once well-known "Fox Under the Hill," at the wharf of which the "half-

penny boats" used to land, and from which the ill-fated *Cricketer* started on its last voyage; and the stream of people who used to pour up through the Dark Arches from these boats in the early morning from the City to the West End is well within the memory of the middle-aged inhabitants of the district. For some years past, as the leases of this property have been falling in, schemes for dealing with it as a whole have occupied the attention of the marquis's advisers; but the many obstacles, apart altogether from the question of cost, which surrounded the matter, for long delayed any practical solution. At the commencement of negotiations, the main difficulty was that the property could only be acquired under a lease, and although the terms offered may have been fair and equitable, it was not easy to raise a sufficient capital to cover so large a site on such a tenure, however favourable; but when, under the Settled Estate Acts, the marquis was enabled to part with the freehold, one principal obstacle was removed. Besides this, there were so many rival schemes submitted for the laying out of the estate, that it was difficult to decide which should prove the most economical and profitable. These schemes were of two classes, and their principal features were, in the first case, the formation of a thoroughfare, which should connect the roads on the Embankment level with the high level of the Strand, and, in the second, the preservation intact of the present private character of the property. The Metropolitan Board of Works favoured the former idea, and proposed a street partly on arches passing round the front of the Adelphi, and by gradual curves into the Strand. But the objection to this scheme is two-fold. The gradients in any case must have been extremely heavy, as the proposed street would deliver itself at the highest point of the Strand, and, should the street have become much used, the through traffic would be scarcely likely to prove of any benefit to the estate. The idea of retaining the privacy of the property found most favour. Several schemes were worked out for this, some retaining the sites of the present streets and merely rebuilding the houses; but the one prepared by the authors of the design we publish to-day was the one which formed the basis of negotiations which took place some years ago when a lease was being applied for, and it has since been adopted by the purchasers of the estate, and provides for dealing with the site as a cleared one. Before dealing with this scheme in detail, we would more particularly describe the site as it exists. The gross area, including the two streets, is about 2½ acres, the dimensions being roughly 390ft. by 235ft. The northern end abuts on the back fronts of the houses in the Strand, and is there some 35ft. above the level of the low-lying road by the Embankment Gardens. The houses of Cecil-street and Salisbury-street occupy about three-fourths of the area, and the streets fall about 5ft. towards the river in their length, and end abruptly with an iron railing overlooking the lower land and the gardens. The boundaries of the liberties of the Savoy and Westminster and two parishes, and their district surveyor's districts intersect the property. At the south end, the estate adjoins the Embankment Gardens, with at present only a temporary wooden fence separating them. Behind the low buildings, and beneath the iron railings mentioned before, is a rough private road, from which, when the gates are open, one may pass from Carting-lane to the dark arches of the Adelphi and get glimpses of some curious effects of light and shade, and some picturesque ruins scarcely to be expected by a stranger so near the Strand. In dealing with the site, the architects have taken advantage of the almost unique position of the property relative to the different levels, and have adopted the general idea of the Adelphi and its substructures as the principal feature of their scheme. But over the Adelphi the estate has this great advantage, caused by the construction of the Embankment, in that the Adelphi was kept back from the old river line by the wharfage before it, which had to be preserved; the destruction of the wharves and river front before the Salisbury Estate enables the buildings in the latter to be advanced to the utmost extent of the property. It is therefore proposed to construct, first a plateau, level with the Strand, over the whole area of the site, having beneath it, and forming the sub-

structures of the buildings to be erected over, a story about 35ft. high, entered from the Board of Works road on a level with the Embankment and absolutely distinct from the Strand level. The plateau over this is proposed to be laid out as a square, entered from the present Cecil and Salisbury-streets, and surrounded by the several buildings to be erected. It is intended that this shall be altogether private, and closed by gates at the entrances from the Strand. As the freeholders are open to negotiations for letting off portions of the estate, nothing has yet been definitely decided as to the details of the several buildings beyond the general arrangement as described above; but the following may be taken to be their intention, subject to such modifications as circumstances may call for. At the southern end, it is proposed to erect an hotel, the situation of which, for its perfect views of the Thames and its accessibility to the best parts of the Strand, and at the same time with the perfect quietness of its surroundings, would be unrivalled among the large hotels. There would be entrances on both the Embankment and Strand levels, and also on the lower level would be restaurant accommodation specially for the theatres, so thickly set hereabouts. Immediately adjoining the hotel, it is proposed to erect a theatre, drawings for which are now before the Board of Works, and which for completeness of arrangements, for access and egress on the two different levels, will be difficult to rival; but of this and of the buildings generally, we hope at some future time to give more detailed descriptions. The purchasers of the freehold are Messrs. J. W. Hobbs and Co., Limited, of Cecil-street, Strand, and the architects acting for them in the matter are Messrs. Perry and Reed, of John-street, Adelphi.

## OLD PLASTER HOUSES, MEDMENHAM.

THE Old Houses, Medmenham, I think, need no description, as they are only an example of many such to be found round about, and were sketched more as an example of picturesque grouping than anything else. The drawing reproduced was hung at the Royal Academy exhibition this year.—LAURENCE YOUNG.

## ST. PATRICK'S CHURCH, BAMPTON.

THE old church at Bampton was one of those nondescript sort of buildings familiar in connection with the Georgian period, quite unsuited for modern uses, but structurally fairly sound, with a solidly-constructed roof, covering a wide, uninterrupted area forming the nave. Mr. Charles J. Ferguson, F.S.A., of Carlisle, has lately remodelled the church, and we illustrate his work by an interior view to-day, showing the timber arcade erected on the old gallery posts and dividing the church into nave and aisles. Arches of wood, with plaster fillings, are thrown across from the roof uprights, and the tie-beams are cased with mouldings, while cross arches divide the aisles into corresponding compartments. The chancel is newly fitted, and the east window, with the oak reredos below it, accords with the rest of the work. Rich oak screens of Jacobean character divide off the vestry and organ-chamber from the nave, and harmonise with the pulpit and stalls.

Australia has recently sustained two severe losses in the ranks of the architectural and engineering professions. On August 4th Mr. Morell, of Messrs. Morell and Kemp, of Sydney, passed over to join the great majority, and on the following day Mr. E. W. Wright, of the firm of Wright, Read, and Beaver, of Adelaide, also closed a long and honourable career. The late Mr. Wright arrived in the colony in 1848, and at once took a leading position in his profession. He was President of the Association of Architects, and some time ago was elected Mayor of Adelaide. Among his chief works were numbered the Town-hall, the Post-office, and several of the banks and other public buildings in the colony. He was 64 years of age.

The memorial stone of new Sunday-schools and lecture hall, in Baker-street, Hull, were laid on the 6th inst. The schools are from the designs of Mr. W. A. Gelder, A.R.I.B.A., architect, of Hull. They consist of assembly hall, 58ft. by 33ft., with gallery, elementary boys' and girls' schoolroom, infants' school, classrooms, library, &c. The style is Queen Anne, and the buildings are faced with red stock bricks, with Ancaster and Howley Park dressings. The cost will be about £2,000. Messrs. Marsden and Hodson are the builders.

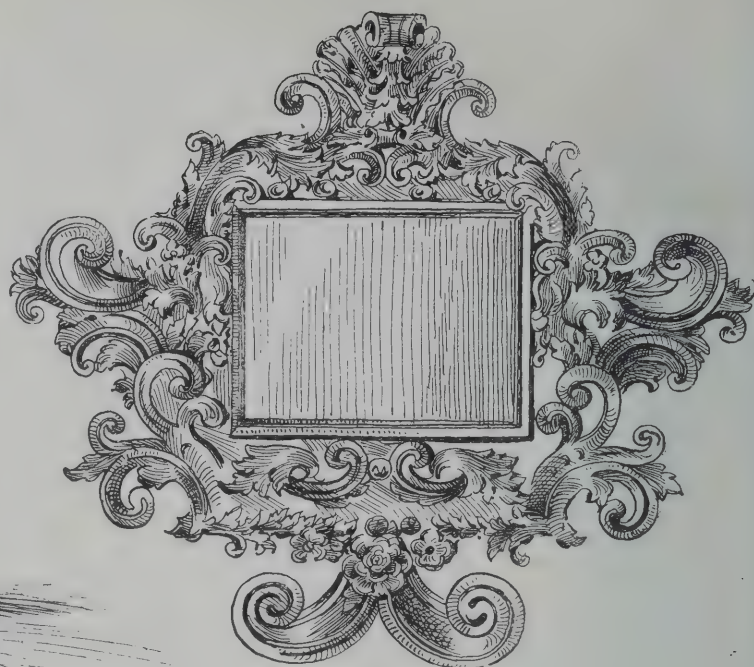








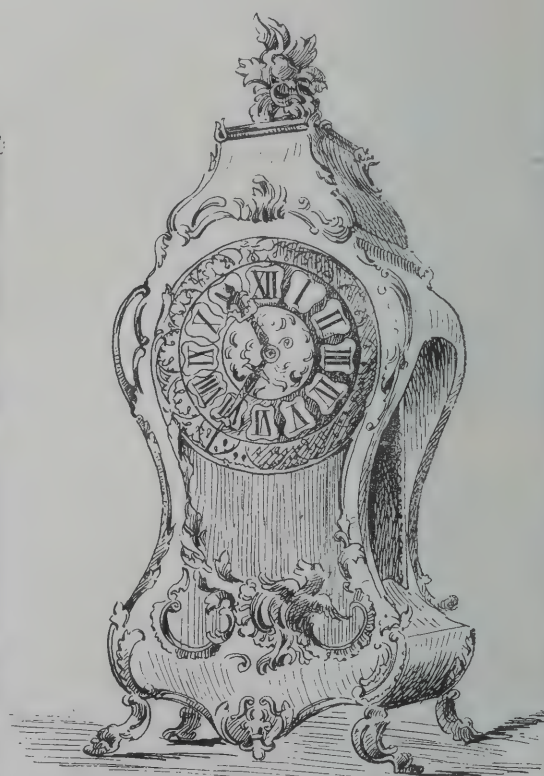
LOUIS XV · CARVED GILT · CHAIR



QUAINT · OLD · CARVED · FRAME



OLD · WROT · IRON · GERMAN · GATES



VERNIS · MARTIN · CLOCK  
 SKETCHES OF DECORATIVE · FURNITURE  
 AT · M<sup>R</sup> · GEORGE · SINCLAIRS  
 KING · STREET · SOHO



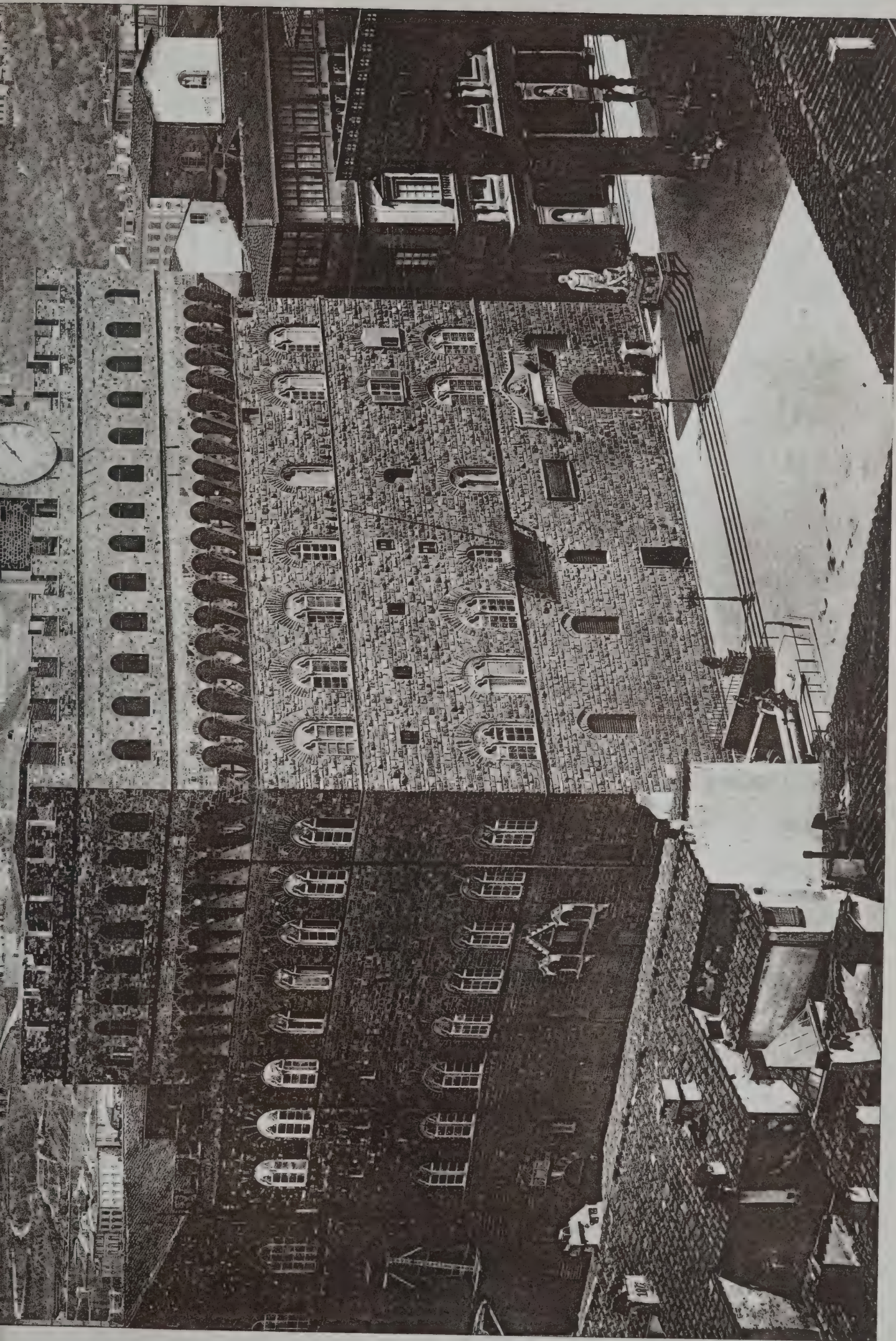




THE BUILDING NEWS, OCT. 12, 1888.







PALAZZO VECCHIO — FLORENCE.

"Photo-Tint" by James Akerman 6, Queen Square, London, W.C.













PHOTO-TINT, by James Acland, 8, Queen Square, London, W.C.

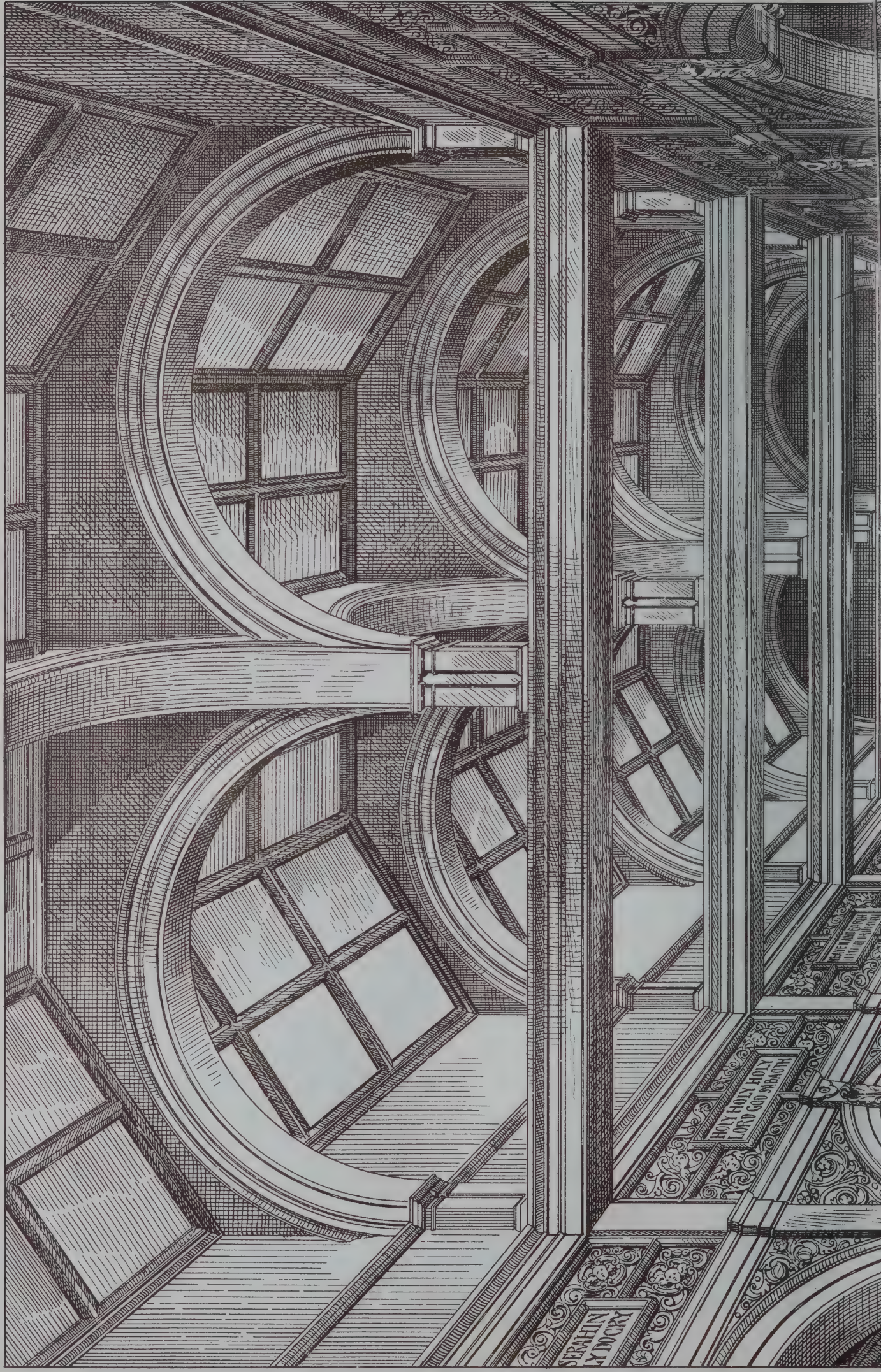
OLD PLASTER HOUSES MEDMENHAM BUCKS



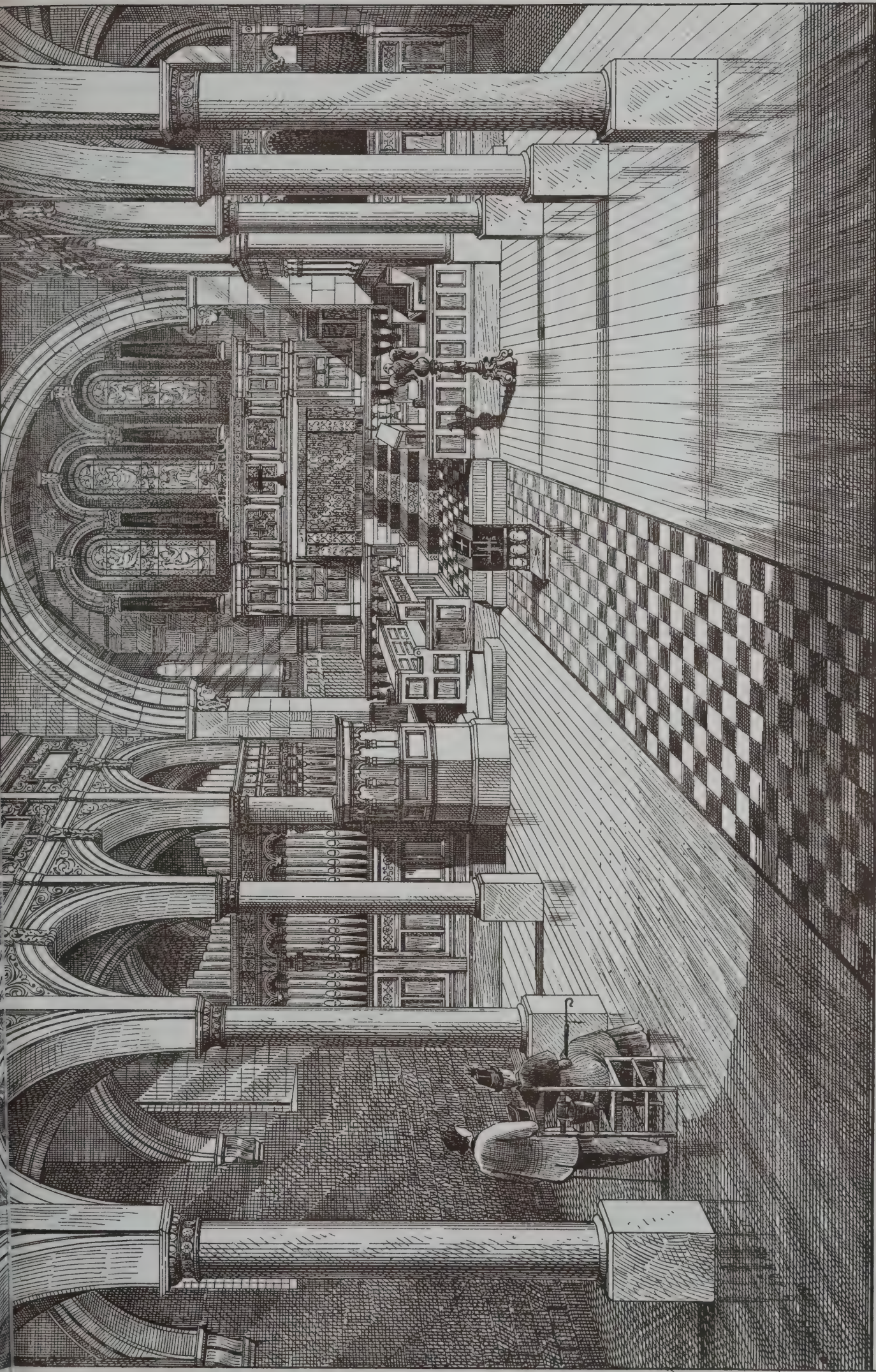




THE BUILDING PEWS, OCT. 12, 1888.







INTERIOR VIEW OF S: PATRICK'S CHURCH BAMPTON AS ALTERED CHARLES J. FERGUSON F.S.A.

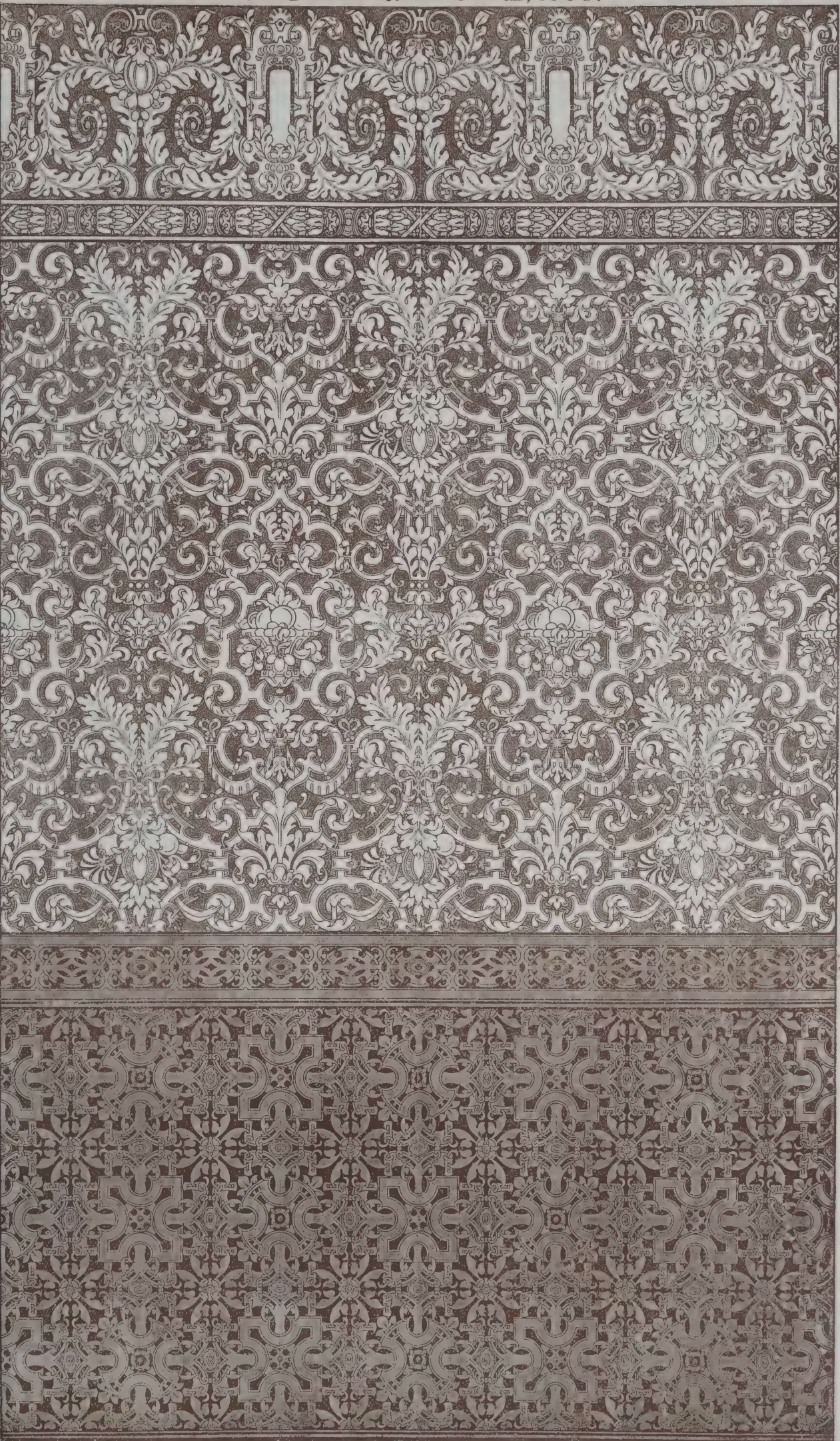
ARCHT.

Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.









1' 9"

PHOTO TINT: BY JAMES AKERMAN, 2, QUEEN SQUARE, LONDON, W.

FREE CLASSIC DECORATION  
DESIGNED BY HAMPTON W. DRATT, FRIBA.









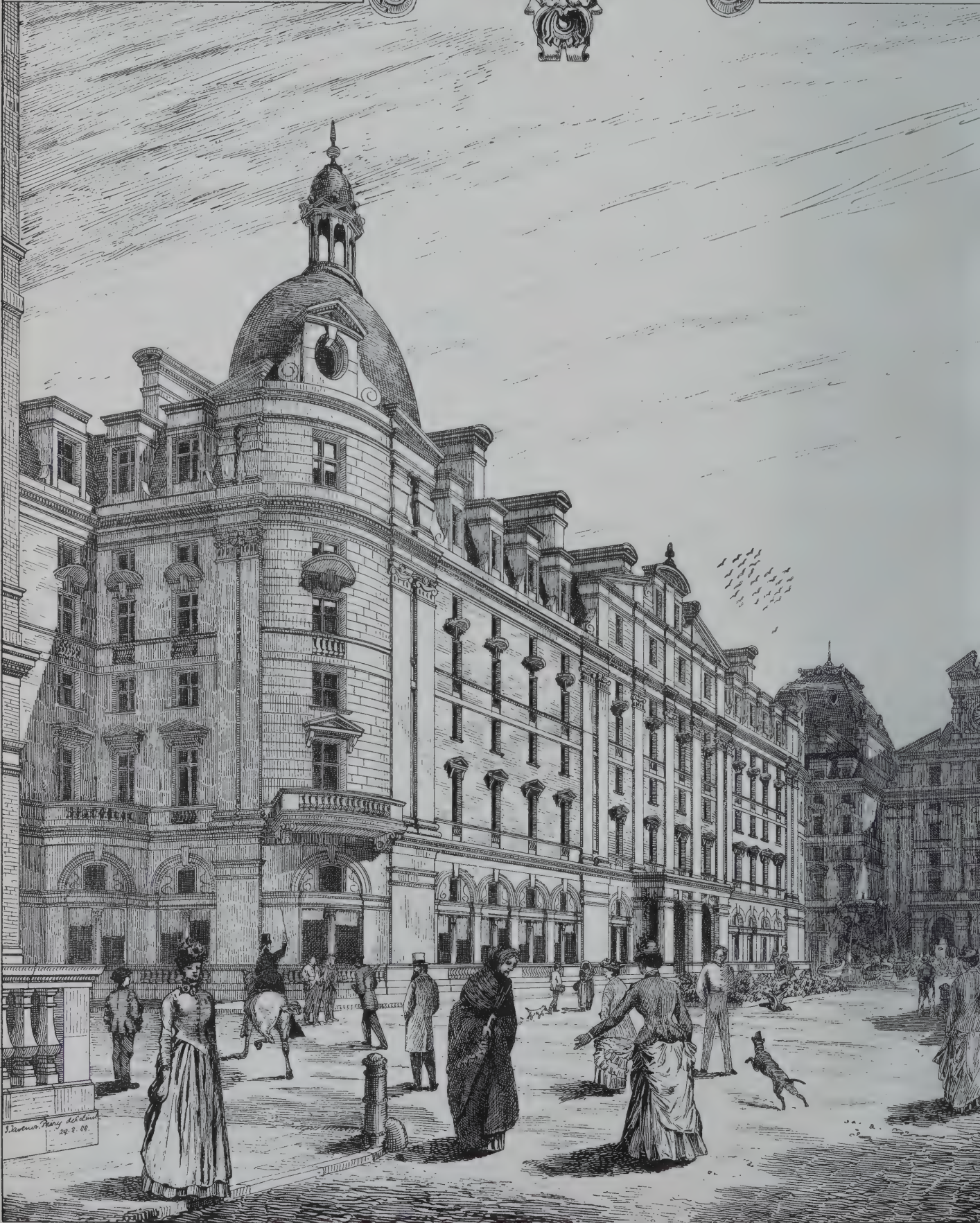
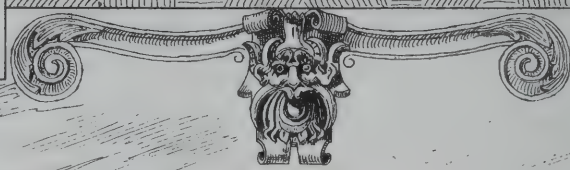
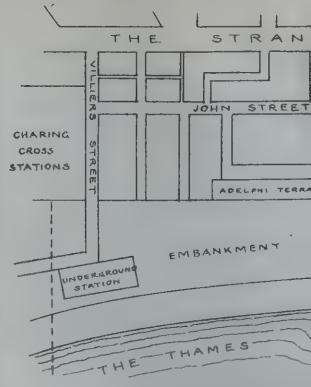




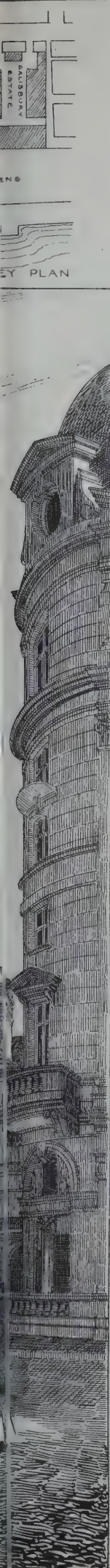
# SALISBURY ESTATE STRAND QUADRANGLE

PERRY AND REED  
ARCHITECTS

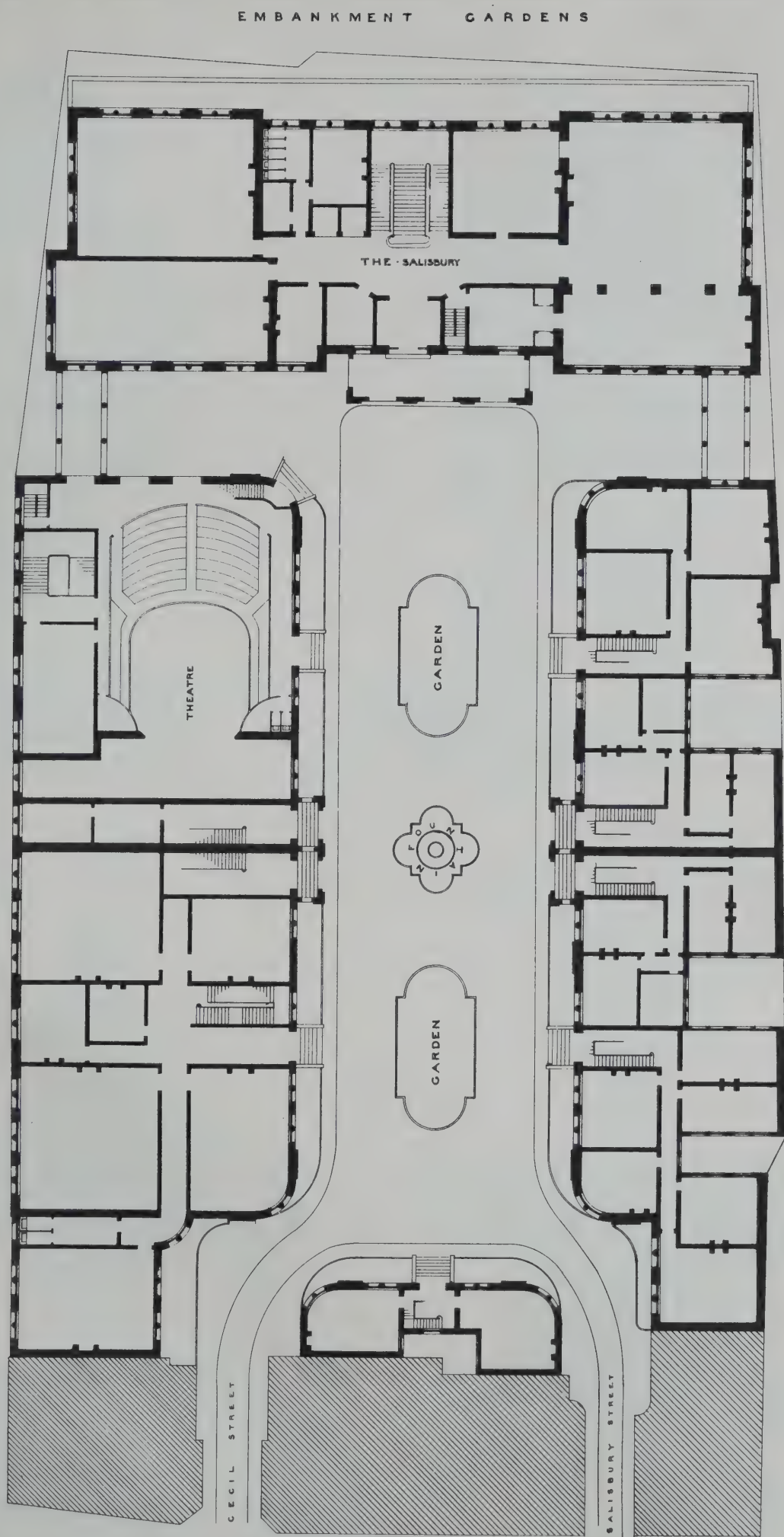
J.W. HOBBS AND CO. LD  
CONTRACTORS







C A R T I N C L A N E



PLAN ON STRAND LEVEL

SCALE 16 FEET TO 1 INCH

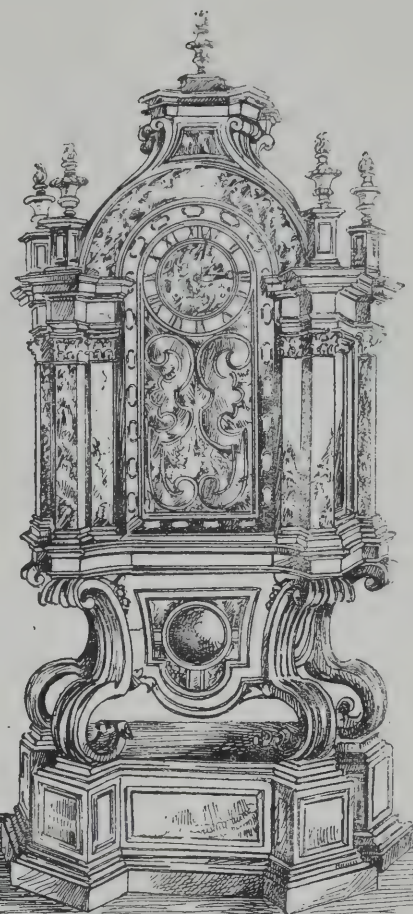








ENAMELLED MANDARIN JAR



ITALIAN CLOCK



LOUIS XIV CHANDELIER



ROSEWATER EWER







## WAYSIDE NOTES.

**A**NOTHER sarcophagus of Alexander the Great! "According to our Berlin correspondent," says the *Standard* last week, "news has been received from Egypt to the effect that the tomb of Alexander the Great, which Dr. Schliemann sought in vain last winter, has now been discovered in Alexandria." If anyone ought to make such a discovery it is the indefatigable Dr. Schliemann. But it is too much of a good thing to have a fresh sarcophagus of the only Alexander cropping up every few months. How about the rival claimant at Sidon? The present tomb was found in a brick vault, about 20ft. high, covered by about 8ft. of earth. The coffin is said to be beautifully decorated, and withal of marble. Three feet and a half is the span of its breadth, and 36in. is the measure of its height. Inside was discovered the skull of a man. That is all the present information on the subject. Much is for the moment left to the imagination, and some margin for speculation as to how the skull managed to get into the tomb without the skeleton. It will be almost a pity when Alexander's tomb is really and truly unearthed, as we shall be deprived of the pleasant periodical flutter in the archaeological world. It will be difficult to believe in any sarcophagus being the genuine article, as "Wolf!" has been the cry for so long.

Touching Egyptian archaeology, I would express a regret at the prospect of renewed trouble in Upper Egypt. The unsatisfactory state of affairs in this quarter of the globe must prevent anything in the nature of a pilgrimage to a large number of ancient monuments situate therein. I believe that Wady Halfa—793 miles from Cairo by the way of the waters of the Nile—is the uttermost point Equator-wards that can be reached without running the risk of becoming unwillingly draughtsman-in-chief to the latest Mahdi at Khartoum, or suffering other inconveniences. This is a pity, as the Egyptian archaeologist is now cut off for an indefinite period—probably for generations to come—from visiting many extensive and interesting ruins of ancient architecture, among which are the temples of Thothmes III. at Semneh, the solitary ruins of Wady Owatib, and of the Temple of Abou Naga; not to mention the eighty odd porticoed pyramids of Meroe, all of which are, comparatively speaking, on the Nile. Even between Cairo and Wady Halfa travelling on the Nile must be risky, owing to our past treatment of the Egyptians.

The ailments of the Monument received the attention of the Court of Common Council on Thursday last week. Mr. H. H. Bridgman asked the chairman of the City Lands Committee whether he could reassure the public mind as to the safety of the structure, and whether the cause of the fall of the masonry was due to the construction of the subway within fifty yards of the base of the column. Mr. Frank Green said he was glad of the opportunity to reassure the public, through the Court, that every possible step had been taken to insure the safety of the Monument, also of the public; but that it was impossible to say whether the subway was the cause of the accident or no; for his part, he did not think so. Most persons in a position to give an opinion will draw different conclusions when they observe the state of many of the houses in King William-street and Arthur-street West, which have suffered in much the same way as did the buildings in Cannon-street when the Inner Circle Extension was completed.

The Corporation of Yeovil, I see, want to purchase 80ft. of good clock-tower architecture, not to cost more than £7 10s. per foot run of altitude—foundations extra. No premiums are offered to those who can supply a good article at a fair price. Neither do the Corporation promise to engage any assessor on the competition for the job. It would appear, that if the tower is to be solid, and look architectural, the Borough of Yeovil will have a bargain at the price offered to the profession.

Restorations have been conducted at Windsor Castle of late—on a small scale, however. The

roofing of the Victoria Tower and the Royal apartments is being repaired; and the battle-memorial of the Garter Tower, which it is said were in a very dilapidated state, have been replaced with much new stonework. No need for any excitement here, as we, most of us, know, though a partially-informed member of the S.P.A.B. might feel indignant for an hour or so after hearing the news. Concerning restorations, I must apologise for overlooking your correspondent, Mr. Francis Grayling's letter *re* Milton-next-Sittingbourne. I hasten to say that I feel confident that the old building is in safe hands, and will be repaired, as all such work should be, rather than undergo the more than doubtful process known as "restoration." I fully believed at the time that no destruction of old work was contemplated at Milton Church. The vein of sarcasm in my note was evidently too feeble to be perceived by all.

The cause of technical instruction progresses. Last Friday the new schools of the People's Palace, in the East-end, were formally opened. These schools will be equal to the wants of five thousand evening students in the coming season. There are five workshops, fitted with benches, iron and wood-turning lathes, drilling and planing machines, and other needful tools and appliances. Nine class-rooms have been provided for instructions in the handicrafts, such instruction being furnished for the very low fee of sixpence per week, or five shillings per quarter. A lecture-theatre is also included, to be used every evening throughout the winter. There is also a photographic studio. A very splendid addition to the People's Palace, one is led to reflect, is this set of workshops and rooms for technical instruction. The object here, it is stated, is not to teach a trade, but to make a lad handy with tools, so that he may be well prepared to enter a business and make better use of his apprenticeship. Work commences in earnest on Monday next.

Rapid advances are being made with the schemes for the institutes in the South of London. The Goldsmiths' Company have made a most princely gift to the Executive Committee of the South London Polytechnic Institute—one whose value is estimated as equivalent to £85,000. It appears that the Goldsmiths' Company have made a proposal to the Charity Commissioners, whereby the buildings, with seven acres of land, at present occupied by the Royal Naval School at New Cross, will be acquired by the Commissioners out of the City parochial charities. This proposal has been agreed to by the Commissioners, subject to the approval of Parliament. The arrangement, I conclude, is on the £1 per £1 principle. In addition to the above, both the Charity Commissioners and the Goldsmiths' Company have agreed to allow a yearly endowment of £2,500 each. The institute will be called the Goldsmiths' Company's (New Cross) Institute. I hope the Mercers' Company will soon do likewise, and leave South Kensington to contemplate the collapse of the "City and Guilds Institute" it has caused.

I have read, and enjoyed, Professor Roger Smith's lecture on "Mistakes in Architecture." It is, doubtless, often a good plan to point out how *not* to do things, rather than the reverse. It is easy to tell a person all about the grand things he may do, but it is of far more practical moment to point out the pitfalls in his path. The students at the London University must have dispersed last week with much matter for grave reflection, and with a sense of having been shown many danger-signals ahead. This is better than inflating them with the gassy stuff generally served out on occasions of opening addresses.

The session 1888-9 of the Architectural Association, under Mr. Herbert D. Appleton's Presidency, will, I venture to say, be a popular one, and the meetings well attended. A front elevation of Mr. Appleton appears in the current number of "A.A. Notes," the letterpress in which includes an interesting extract from Viollet-le-Duc's *Dictionnaire Raisonné*, an account of "Ramblés in Kent," by Mr. Reginald A. Rix, and "Strains in Structures." A view of Hatfield House and two of Haddon Hall are among the illustrations. In the list of lectures for October, there is one on "Theatres," by Mr.

Max Clarke, before the Advanced Construction Class; and one on "Shoring and Underpinning," by Mr. Lovegrove, respectively on the 24th and 26th October. Among the letters to the Editor is one from "A Student," who wants to know whether sketching is a failure. This correspondent says he does not know what to sketch. At times there is some excuse for such a complaint; but he may rest assured there is no danger of him doing himself any permanent injury of a serious kind by over-sketching. Turner may be held up as an example to all who talk of the difficulties of selecting subjects. The great painter could not have spent many hours in his life considering what he should sketch, but had an object in his notebook in less time than most of us take thinking about the doing of the thing. A marvellous variety of subjects did Turner sketch; nothing seems to have been too humble or insignificant, and nothing too elaborate or complicated. "A Student" should cultivate the invaluable habit of instantaneous criticism, and learn to decide in a moment what to sketch in a given scene, and get it in as quickly as is consistent with accurate work, remembering that, in spite of prevailing fashions, he will learn something from every building, be the style of architecture what it may.

I am glad to see that the registration movement is making headway in Australia. Some months since you referred to the agitations which have arisen in Victoria and South Australia in reference to the felt necessity for architects' registration in those colonies. Your spirited contemporary, the *Building and Engineering Journal* of Melbourne, in commenting in its last issue on the fact that an influential deputation of the leading architects of that city recently waited on the University Council with a view to get a Chair of Architecture established, remarks: "If this were accomplished no doubt the granting of a diploma or degree in architecture would follow, and that in time would weed out a number of very undesirable 'brethren,' who are no great credit to the architect fraternity. But even were such a chair already established, the 'weeding' out process would take a long time, and the present want may be much more quickly satisfied by the provision of a Registration Bill, which, if properly framed, would be an immense boon to every genuine architect in the colony. This matter again came up before the Melbourne Institute in the course of an able paper, by Mr. Inskip, on 'Architectural Education.' His views are to some extent embodied in the proposed measure for the creation of a 'General Council of Architectural Education and Registration.' The unfortunate and acrimonious differences which have arisen among the architects in England over this question of registration have been happily wanting here, thanks to the strong good sense of the members of the profession, but we confess that we quite fail to see on what possible grounds the London R.I.B.A. oppose a scheme which cannot but do good in greatly raising the status of the profession in every part of the United Kingdom." Nor can I understand their objection.

The same journal contains illustrations of a coffee palace just erected in Melbourne, which far exceeds anything attempted in this country alike in costliness and scale. It occupies the corner of Collins-street and King-street, containing no fewer than 560 rooms, and has cost £106,000, in addition to £48,000 paid for the site. The building is treated in a French Renaissance style, very freely rendered, and is much too florid for English tastes. An elongated conical turret is, of course, placed at the junction of the two streets, and terminates in an iron-framed bulbous cupola, while the projecting masses abutting on this jointure are unduly crowded. The great fault of the design is that the main cornice is too low down on the elevation, the lofty two-storied attic above looking like an after-thought clumsily worked in. Notwithstanding all these loud-crying defects, the Federal Coffee-Palace is an imposing structure, of which the citizens of Melbourne will doubtless boast exceedingly, and its architects, Messrs. Elleker, Kilburn, and Pitt, are to be congratulated on a big job well carried out.







	ft. in.	ft. in.	
12	12 10	154 0	2in. by 2in. fir wrought, framed, rebated, and moulded frame for iron casement.
12			Wrought-iron frame and casement as before, 3ft. 5in. by 2ft. 6in. and (4).
17	3 2	88 8	Lead lights and glass and glazing in iron frame.
12	2 4		Elsey's patent fanlight opener as before.
12 2	23 9	570 0	(4) on frame b.s. measured.
12 2 2	4 7	220 0	
12 2	5 11	142 0	
12 2 20			
12 2 2	4 7	55 0	480 Squares.
12	4 9		48 Casements.
12	8 38	0	Galvanised iron tongue, &c., as before.
12	4 9		1½ in. deal wrought, tongued, and rounded window bed as before.
12	9 42	9 (4).	24 Notched and rebated ends.

## SMALL WINDOWS IN SIDE WALLS OF END WARDS, 2FT. 3IN. BY 6FT. 3IN.

2	1 6	18 9	Deduct extra to red brick facing.
2	2 4		
2	4½	1 9	Extra to segmental arch as before.
2	2 7	6 0	
2	1 2	6 0	
2	8 6	7 0	
2 2	6	2 0	Circular fair cutting over arch.
2 2	1 2	4 8	Fair cutting to skewback.
2	2 4	4 8	Segmental centre to 4½ C.
2	3 1	6 2	Circular red brick label moulding.
2	2		Moulded returned S.E. 4.
2	2 3		
2	6 3	28 2½ B.	Deduct.
2	2 10		
2	6 7	37 4½ B.	
2	3 10		
2	9		
2	3	1 5	Fir lintel.
2	4 0		
2	9	6 0	Ro. relg. arch in cement.
2	2		Fir b. and p.
2	2 10		= 16 Deal joint bricks.
2 2	4 10	27 5	Deduct R. F. S. and twice colour.
2 2	6		Portland cement reveal narrow, and twice C.
2 2	4 10	9 8	
2 2	4 10	19 4	Slightly rounded angle.
2	2 10		4 S.E. rounded angle in Portland cement.
2	8	2 10	Portland cement soffit on lath and counterlaths and twice cement.
2	2 0	5 8	Slightly rounded angle.
2	15 10	31 8	4 Ms.
2	2 10	5 8	4 by 3 fir wrought, framed, rebated, and beaded frame.
2	11 10	23 8	4 by 3 oak sill as before.
2	2 1		Labour to groove for plaster.
2	5 6	22 11	4 S. to do.
2	2 1		2in. moulded sash on butts as before.
2	5 6		2 Pair 3in. butts.
2	1 10		2 Brass lever casement fastener.
2	5 0	18 4	2 Do. do. stay.
4	16 10	63 4	21oz. sheet in small squares.
4	2 10	11 4	4 Frame.
4			4 Casement.
4			32 Squares.
4			N.B.—Take half the above Pt. for twice V.
4	2 10	5 8	Galvanised iron tongue, &c., as before.
4	3 0	4 0	1½ deal wrought rounded window bed and bars.
4	8		4 Mitred and returned ends.
4	3 0		
4	9	4 6	(4) and twice V.

## WINDOWS TO W.C.'S AND SINKS.

	ft. in.	ft. in.	
4	1 6	22 6 ½ B.	Deduct.
4	3 9		
4	2 0	32 0 ½ B.	
4	4 0		
4	1 6	2 3	Extra to cut rubbed gauged flat arch in red bricks.
4	4½		
4	1 7	4 9	
4	9		
4	1 6	6 0	T. P., 4½ S.
4	9	6 0	Fair cutting to skewback.
4	8 9	11 3	Deduct extra to red brick facing.
4	3 0		
4	4½	1 2	Fir lintel.
4	4		Fir b. and p.
4	2 0		Double flat bricks.
4	2 9	22 0	Deduct R. F. S. and twice C.
4	10 6	42 0	4 by 3 fir wrought fird. rebated, and beaded frame.
4	2 0	8 0	4 by 3 oak sill as before.

	ft. in.	ft. in.	
4	1 6	22 6	2in. deal moulded casement on butts as before.
4	3 9		4 Pair of 3in. butts.
4			4 Japanned iron lever casement fastening.
4	1 2	4	Do. lever stay.
4	3 4	15 7	21oz. sheet in small squares.
8	10 6	84 0	(4) fir.
8	2 0	16 0	Casement (4).
8	8		3 squares.
8			N.B.—Take half the above paint twice V.
4	2 0	8 0	Galvanised iron tongue, &c., as before.
4	8 0	32 0	2½ by ¾ deal wrought splayed and rd. fillet as architrave, including mitres.
8			Rounded ends to do.

## CIRCULAR WINDOWS IN GABLES

4	3 9	44 0	Deduct extra to red brick facing.
4	2 3	15 10	Deduct half brick.
4	2 9	23 9	Deduct one brick.
4	8 8		
4	9	26 0	Circular annexed arch.
4	11 8		
4	9	35 0	
4	8 8	26 0	Centre for circular window.
4	8 8	34 8	4 by 3 fir wrought framed circular frame, rebated and beaded, including all joints grooved for plaster.
4	2 3	20 3	2in. deal moulded circular casement, with wide moulded bars hung on centres with cut and mitred bead measured square.
4	2 3		Pr. brass sash centres.
4			Set lines, pulleys, &c., to open and shut casement 21ft. 6in. from floor.
4	1 11		21oz. sheet glass in small squares.
4	1 11	14 8	
4	5 10	23 4	Circular cutting and risk to do.
4	4		B. and P.
4	16		Deal joint bricks.
4	8 8	17 4	Pair casement narrow reveal, circular and twice V.
4	6	34 8	Labour rounded edge to do.
4	8 8	23 9	Deduct R. F. S. and twice cement.
4	2 9	34 8	(4) on frame.
4	4		Casement.
4	20		Squares (4).
4	8 8	34 8	(4) and twice V.
4	4		Casement (4).
4	20		20 squares (4) and twice V.

## INSPECTION WINDOWS.

4	2 3	47 3	Half brick } deduct.
4	5 3		
4	2 9	60 6	Half brick }
4	5 6		
4	2 3	3 5	Annexed segmental arch.
4	4½		
4	2 0	7 3	
4	9		
4	2 3	9 0	Centre to do. 4½ S.
4	2 9		
4	4½	4 2	Annexed flat arch.
4	2 18	8 9	(2), 11.
4	9		
4	2 9	11 0	T. P. 4½ S.
4	2 3		
4	3 0	27 0	Deduct R. F. S. and twice c.
4	2 9		
4	3 3	35 9	
4	16 6	66 0	4 by 3 fir wrought framed moulded frame.
4	8 3	33 0	Labour to groove in frame.
4	2 9	11 0	
4	2 3		2in. deal moulded fixed sash in S.S. with wide bars.
4	5 3	47 3	
4	2 0		
4	4 10	38 8	21oz. sheet-glass in S.S.
4	2 9		1½ in. deal rounded tongued window bed and bars.
4	8	7 4	8 Notched and returned ends.
4	9 3	37 0	2½ by ¾ deal fillet as architrave.
4			8 Rounded ends.
8	16 6	132 0	4 Frame and twice V.
8			64 Squares do.
4	2 9		
4	9	8 3	4 and twice V.
4	8 3		Portland cement narrow reveals as before.
4	6	16 6	
4	2 3		
4	6	4 6	Deduct and add circular do.
4	6 0	24 0	Labour slightly rounded edge to Portland cement reveal.
4			8 S.E.
4	2 3	9 0	Do. circular do.
4			8m.
4			4 Frame b. and p.
4			32 D.I. joint bricks.
4			MEM.—The windows to first floor will be taken with roof.

(To be continued)

## ARCHITECTURAL ASSOCIATION CONVERSAZIONE.

THE forty-seventh session of the Architectural Association was inaugurated on Friday evening by a Conversazione given at the Town Hall, Westminster, when a large number of members and lady visitors assembled to meet the new President, Mr. Herbert D. Appleton, F.R.I.B.A., and the Council. The chief attraction for the evening was the band of the Royal Scots Guards, which played in the large hall, and a concert of vocal and instrumental music given in the council chamber, in which Madame Isabel George, Messrs. Herbert Schartau, Charles Chilly, J. Elvin, and Herr Polonaski (violinist) took part.

The loan exhibits, particularly the trade displays, were restricted in number, but were generally of high quality, and a new and agreeable feature in the arrangements was the introduction of a profusion of cut flowers and foliage plants for decorative purposes. The measured drawings, sketches, and designs executed in the various classes, were hung in the suite of rooms on the first floor. The chief contributors of water-colour sketches were Messrs. R. Phené Spiers, Gerald Horsley, H. O. Cresswell, W. Millard, F. T. W. Miller, R. Elsey Smith (who sent numerous drawings in colour and sepia of the Temple of Aphrodite at Paphos), H. D. Walton, R. T. Conder, C. E. Mallows, Aston Webb, and A. B. Mitchell. As usual, a feature of the exhibition was the series of photographs by Mr. John L. Robinson, R.H.A., illustrating the recent A.A. excursion in Derbyshire.

In the large hall were hung numerous new patterns of wall papers shown by Messrs. Jeffrey and Co., including the Free Classic design by Mr. Hampden V. Pratt, which forms the subject of one of our photo-lithographs this week; an arabesque embossed leather paper in crimson and gold, by Mr. Lewis F. Day; another by the same artist, having a deep frieze, in which the emblematical subjects of Earth, Air, Fire, and Water were introduced in medallions; the Woodpecker design, by Mr. S. Mawson, and a decoration in panels of Persian ornament, by Mr. A. F. Brophy. Messrs. William Woollams and Co., of High-street, Marylebone, and Messrs. W. Morris and Co. had also good displays of specially-designed wall-papers. Messrs. C. Hindley and Sons exhibited a large china cabinet in white wood, fitted mantels, and carpets. Mr. H. C. Liley showed illustrations of works of coloured decoration at Tokenhouse-yard and elsewhere, carried out under his directions; Mr. G. H. de Wilde showed specimens of wrought-iron work; Mr. W. de Morgan, of Chelsea, decorated vases and tiles; and Messrs. Steel and Garland the Marlborough grate. The Incandescent Gas-Light Company added to the illumination of the great hall by their display of Welsbach gas-lights on the platform and under the galleries, and the Coalbrookdale Iron Co. sent numerous examples of their art castings and some mantels, and Messrs. Longdean and Co. also showed specimens of ironwork.

In the course of the evening the President, who was heartily received, announced the following as the

## PRIZE LIST.

Architectural Association Studentship.—D. J. Blow; 2nd, R. D. Warry.  
Aldwinckle Travelling Studentship.—H. V. Lanchester.  
A. A. Medal.—Banister F. Fletcher; hon. mention, E. L. Lutyens.  
Architectural Union Company's Prizes.—1st, S. Tugwell; 2nd, not awarded.  
Blashill Prize.—No competitors.  
Cates Prize.—A. W. Hemmings.  
Ernest Turner Prize.—A. W. Jarvis.  
Elementary Class of Design.—Section I.: 1st, A. E. Habershon; 2nd, P. G. Eade; hon. mention, H. A. Saul and C. H. Strange. Section II.: 1st, A. W. Jarvis; 2nd, C. Bywater; hon. mention, R. A. J. Bidwell.  
Elementary Class of Construction.—1st, A. W. Cleaver; 2nd, F. H. Greenaway.  
Elementary Class of Ornament and Colour.—1st, C. S. Haywood; 2nd, V. T. Jones. Class Prize, V. T. Jones.  
Class of Design.—1st, D. J. Blow; 2nd, C. O. King; hon. mention, J. E. Jefferson.  
Colour Decoration Class.—1st, H. V. Lanchester; 2nd, C. J. L. C. de Beaupré; Time Sketch Prize, C. J. L. C. de Beaupré.  
Class of Construction.—1st, O. Oertel; 2nd, H. Ermrich.  
Advanced Class of Construction.—Owen Fleming.  
Quantity Class.—A. O. Breeds and G. Harvey, eq.  
Sketch-Book Prize (Title-Page).—W. G. B. Lewis.  
Neale Prize.—S. Greenslade; hon. mention, H. Tooley and A. C. Walker, eq.  
Edis Prize.—A. Gladding.  
Book Plate Prize.—Not awarded.  
Essay Prizes.—Medal and Ten Guineas, H. Tooley;



bronze medal and five guineas, W. Wonnacott; hon. mention, A. W. Cox.

Lectures on History of Architecture.—1st, F. M. Elgood and O. Fleming, sq.; 3rd, E. Carless; highly commended, W. Pywell and J. Gethin.

Lectures on Construction.—1st, F. R. Taylor; 2nd, A. C. Walker; 3rd, H. E. Mathews; hon. mention, E. Carless and L. J. Veit.

### THE LATE MR. JAMES SELLARS.

WE regret to announce the death, at the early age of forty-five years, of Mr. James Sellars, of Glasgow, the architect of the International Exhibition now open in that city, and junior partner in the firm of Campbell Douglas and Sellars. Mr. Sellars, who died from blood-poisoning on Tuesday, at his residence, Montgomerie-quadrant, Kelvinside, was a native of Glasgow, and served his apprenticeship to Mr. Hugh Barclay, a local architect. His first success was the selection in competition of his design for the Stewart Memorial Fountain, which was carried out, and is a Gothic structure placed in Kelvingrove Park. On the completion of his articles, Mr. Sellars entered the office of Mr. Campbell Douglas, and afterwards joined him in partnership. His works are chiefly designed in various phases of Early Gothic, although he possessed great versatility in design, and successfully worked in many and diverse styles, and are prominent features of modern Glasgow and its suburbs. The works by the firm include the New Club, additions to the Trades Hall (won in competition), banking premises for the Bank of Scotland, George-square, and the City of Glasgow Bank (since converted into a business establishment), University Union Debating Club, Children's Infirmary, the Scottish Amicable and Queen's Insurance Offices, the Victoria Infirmary (of which the Queen laid the foundation stone), the Medical School, Anderson's College, and numerous churches in the city and its vicinity, the best of these being, perhaps, Belhaven U.P. Church, designed in the Renaissance style, and Hillhead Established Church, in which Greek was happily adapted to modern requirements. Among buildings outside Glasgow may be mentioned the Town Halls at Ayr and Sinclairtown, and the Spiers Endowed School at Beith, the latter built at a cost of £12,000, and opened so recently as the 24th ult. Mr. Sellars served as President of the Glasgow Institute of Architects, of the Architectural Section of the Glasgow Philosophical Society, and as honorary president of the Glasgow Architectural Association; his name is on the agenda of the latter body as having promised to read a paper before the members at the closing meeting of the present session, the 19th of February next. A draughtsman of remarkable industry, power, and vigour, and quick to apprehend the requirements of his clients, he imbued all his work with his own individuality, and each detail of every design which left his office was either drawn with his own hand or personally revised by him before being put into execution. He had not the advantages possessed by most professional men of opportunities for foreign travel or leisured study in early life, nevertheless his tastes were refined, his judgment shrewd and independent. He held a foremost position among all Northern architects, and his removal in the zenith of his powers, and in the prime of middle life, will be regretted by all who were brought into contact with his genial presence, and even by those who only knew him by his works. He leaves a widow and young family.

The restoration of the Queen Eleanor cross at Waltham Abbey has just been completed by Mr. Hems, of Exeter, from the specifications and drawings of Mr. C. E. Ponting. The Bath masonry put in 1883 has just been replaced by stone from Ketton, and various pieces of the cross that had long been built into the walls of the Falcon Inn have been restored to their original places in the fabric.

The Wesleyan chapel at Castlethorpe, Bucks, was reopened last week, after enlargement, re-seating, and the addition of vestries. Mr. Poole was the architect, and Mr. Inskip, of Northampton, the contractor.

The foundation-stone of a new church of St. Chrysostom was laid in Bolton-road, Bradford, on Monday. Messrs. T. H. and F. Healey, of Bradford, are the architects of the church, which will cost £5,500, and will be Perpendicular in style. Mr. W. Farnish, of Manningham, is the contractor.

## Building Intelligence.

BALHAM.—On Monday a new reredos was uncovered at Ascension Church, Balham-hill. The new reredos, which stands under the central of the three arches supporting the main east wall of the church, is all of alabaster. It consists of a central carved panel of the Crucifixion about 6ft. by 4ft. wide, deeply recessed behind a richly-moulded and cusped arch. This arch supports a carved gable with ornamental crockets and cross at apex, and forms an ornamental canopy, the tympanum of which is enriched by mosaic panels. The whole of the outer east wall beyond the ambulatory is decorated in fresco tile painting. The architect is Mr. A. Cawston, of 13, Queen Anne's-gate.

EDINBURGH.—A new church is about to be built at the corner of Palmerston-street and Belford Bridge for the Dean Free Church congregation, from plans by Mr. Sydney Mitchell. It consists of a nave and aisles, with a north transept. The east end terminates in a semi-octagonal apse, and at the north-west angle is a tower. The congregation are seated in the nave, aisles, and transept, and in a small gallery over the entrance vestibule at the western end of the church. The roof is open-timbered, and lined with wood. The nave arcade is of stone, carried on stone piers. A special feature is made of the interior treatment of the apse, which contains the pulpit and choir stalls. The rapid fall in the ground from south to north gives space under the church for a large hall, a session-room, a vestry, a ladies' waiting-room, and a caretaker's house, besides lavatory accommodation. The tower is carried up for 75ft. without buttresses or ornament of any kind. It then becomes an octagon, the transition being broken by four flying buttresses. Within the parapet of this octagon is a smaller one, terminating in a short slated spire; the whole height is 145ft. The church will seat 600, and is to cost £7,000. The stone used is red sandstone, from Corncockle Quarry, Dumfries.

EDGEHILL.—St. Anne's R.C. Church, Edgehill, Liverpool, was reopened on Sunday after enlargement and alteration. The additions comprise the lengthening of the nave and two transepts, a chancel, three side chapels, and sacristies. The plan as completed is a Latin cross, and the crossing is formed by four stone arches, one forming the chancel arch. The crossing is groined in wood; the ribs at the angles dying in stone corbels, carved with the Four Evangelists; while at the intersection of these ribs is a boss, on which is carved a dove. In the south transept is the chapel of St. Benedict, which has an apsidal termination. The chancel terminates a five-sided apse, and is divided into four bays. The chapels on either side extend as far as the three first bays of the chancel, and are divided from the latter by a stone arcading resting on marble shafts and bases. This arcading on the Gospel side supports the organ-chamber. The chancel roof is of wood, with moulded ribs. Four of the chancel lights have been filled with stained glass by Hardman and Co., of Birmingham. A leading feature of the church is the baldacchino, which is wrought and carved in oak. Below is placed the altar, which is wrought in Caen stone. The architect of the old church was Mr. Charles Hansom, and the new part has been designed and executed under the superintendence of Messrs. Pugin and Pugin, of Westminster. The works have been carried out by Mr. Thomas Urmon, of Liverpool; altar and baldacchino are by Messrs. Norbury, Paterson, and Co., also of Liverpool; the Communion rails and pulpit are by Mr. Boulton, of Cheltenham; and the metal work is by Messrs. Hardman, Powell, and Co., of Birmingham; the carving by Mr. John A. Hanley, of Saltney, Chester; and the organ by Messrs. Gray and Davidson. Mr. M. Stanley has acted as clerk of works.

LAVERSTOCK, WILTS.—New day-schools at Laverstock have just been opened. The buildings comprise a schoolroom, 34ft. 6in. by 18ft., and a classroom, 18ft. by 15ft. Externally the buildings are of red brick, designed in the Late Gothic style, with large mullioned windows, four-centred arches, and relieved by moulded brickwork. Both schoolroom and classroom

are ceiled at the collar-beams. The wrought-iron weathertight casements were provided by Messrs. Burt and Potts, of London. The cost of the buildings was £540. The works have been carried out by Mr. H. J. Kite, of Fisherton, Salisbury, from the drawings and under the supervision of Mr. Fred Bath, F.R.I.B.A., Salisbury.

LLANDAFF CATHEDRAL.—When this cathedral was restored, about fifteen years ago, the diocesan architect, the late Mr. John Pritchard, surmounted the south-west tower with a spire 198ft. in height from the ground. At that time Dr. E. A. Freeman not only denounced the spire as not in keeping with the remainder of the structure, but also doubted, as the old tower was only surmounted with a pinnacle, whether the foundation would carry the spire. Ten years ago, says the *Western Daily Press*, a rather alarming crack appeared in the tower, and recently a second one, still more alarming. Mr. J. P. Seddon, architect, came down from London, and, on examining the base of the tower, found that a settlement had taken place, and the apex of the spire, when tested, was found to be considerably out of the perpendicular. The work was placed in the hands of Mr. Clarke, builder, who has been two months at work in trying to secure the tower; but local architects are of opinion that the spire will have to be removed. It is stated, but we can hardly believe it to be correct, that a spring was left under the piers without a course being provided to carry off the water, and this has spread and destroyed the mortar connecting the masonry. In the excavations recently made by Mr. Clarke, he has discovered, not only the foundation of an ancient British church, but six stone coffins, the bodies in which were in a perfect state of preservation. The western end of the cathedral is now barricaded.

SHREWSBURY.—The foundation-stone of the new public buildings and market was laid last week with some ceremony. Mr. H. A. Cheers is the architect, and Mr. Price, of Shrewsbury, the contractor. The building will form a rectangle, 150ft. by 45ft., occupying about double the superficial area of the building which it replaces. It will consist of two lofty stories, exclusive of cellars; the ground floor or market space will have a wide entrance in the centre of each front. The market space will be 90ft. by 40ft., exclusive of approaches. The flooring is to be of asphalt, on concrete foundation. A row of six columns, 14ft. apart, will support centrally the beams, carrying the floor over. A market inspector's office and latrines are provided at the east end, also a surveyor's office, and at the west end is the police station, committee-room, and kitchen. The public hall or Corn Exchange is on the first floor, with council chamber *en suite* at the platform end. The assembly-room is the same size as the market space below, 95ft. by 40ft., inclusive of platform, and has a high patented semi-circular roof ceiling. The walls of this room will be relieved by arched windows with frieze and dado in Lincrusta Walton. Next it is the council chamber—a room 34ft. by 25ft., having its separate entrance, and a stone staircase approach from the north side of the building. Red brick facings will be used, with white stone dressings, and the roof will be covered with green slates.

The ceremony of laying the corner stone of the new parochial buildings in connection with St. Giles's parish, Northampton, took place on Tuesday week. The buildings are situated at the corner of Hazlewood-road and St. Giles's-street, and join the Northamptonshire Orphanage for Girls. The design for the buildings was opened to a limited competition, and Professor Roger Smith, who was called in as assessor, recommended the drawings of Mr. S. J. Newman, Abington-street, Northampton, and the committee accepted his judgment. The Queen Anne style has been followed, and the building will be principally of red brick, the facings being enriched with Bath stone. The parish room measures about 55ft. by 37ft., with open-timber roof. Mr. J. B. Clarke's contract at £1,888 was accepted.

The foundation stone of a mission-room was laid at Ambecote, near Stourbridge, on Thursday, the 4th inst. The building measures 47ft. long by 17ft. wide, with an open roof, and will be built in red brick, relieved with moulded brick strings and dressings. Mr. T. Grazebrook, of Stourbridge, is the architect.



## Engineering Notes.

**FORTH BRIDGE RAILWAY.**—The twenty-second quarterly report of inspection by Major-General Hutchinson, R.E., and Major Marindin, C.M.G., R.E., of the works in progress for the construction of the bridge over the river Forth was issued on Monday. The summary is as follows:—Masonry and concrete: Up to the present date about 612,000 cubic feet of granite have been delivered, and 590,800 cubic feet have been set. About 112,260 cubic feet of rubble masonry and concrete work have been built. Steel work—First bays: The whole of the steel has been drilled and fitted. Second bays: With the exception of a small portion of the Inchgarvie joint junction the whole of the steel has been drilled and fitted. The average number of men employed per diem during the quarter has been 3,270. The inspectors add:—"We are glad to be able to report that there appears to be no falling off in the character and quality of the work, which is progressing most satisfactorily. There have been four fatal accidents during the quarter. We desire again to draw special attention to the importance of using every possible means for giving temporary support to the various parts of the cantilevers, until their permanent ties and struts are fixed."

### CHIPS.

The new Victoria Hall at Hanley, the third and last section of the scheme undertaken by the town council for converting the Queen's Hotel into a group of municipal buildings, was opened on Friday. It has been erected from designs by Mr. J. Lobbey, the borough surveyor, the contractor being Mr. Godwin.

The local board of Cheshunt have adopted a scheme, prepared by Mr. T. Bennett, their engineer, of water supply from an artesian well to be sunk at the foot of Darnace Hill. A reservoir, containing  $1\frac{1}{2}$  million gallons, will be erected on the hill, and nearly 15 miles of mains will be laid in the district.

A new Bible Christian Chapel at Week St. Mary, built from plans by Mr. Wise, of Launceston, was opened last week. It is Gothic in character, and has attached to it a school-house and stable. Mr. Bevan, of Lifton, was the contractor for joinery, and Mr. Oliver, of Lifton, for the masonry.

The highest distinction—a diploma of honour—has been conferred by the superior jury of the Brussels Exhibition upon Mr. George Jennings, of Stangate, S.E., for sanitary appliances; Messrs. Chubb and Sons, London, for locks and safes; Mr. J. Phillips, London, for brick-making machinery; and Messrs. Graham and Biddle, London, for furniture.

The local board for Wood Green was created by Act of Parliament last session. It held its first meeting on the 3rd inst., when Mr. Littler, Q.C., was unanimously elected chairman, Mr. J. F. Adams was appointed clerk, *pro tem.*, and the engineering supervision of the district was decided to be left at the outset to Mr. Henry Robinson, C.E., of Westminster.

The Liverpool City Council, at their monthly meeting, held on the 3rd inst., finally approved of a design for an ornamental iron verandah and projecting clock, with two faces, which is about to be erected in front of business premises in Queen-square, from the designs of Mr. Fredk. H. Peate, of that city.

The undermentioned candidates have satisfied the examiners of Cambridge University in both parts of the examination for certificates of proficiency in sanitary science: G. Adkins, A. J. Anderson, S. Barwise, J. F. Caiger, S. Davies, E. Drummond, R. S. O. Duffield, G. F. W. Ewens, W. B. Featherstone, J. Glaisher, J. Hickman, W. Little, W. T. G. Robinson, P. C. Smith, J. Sheen, T. Thompson, F. C. A. Treadgold, W. Venis, G. Vincent, H. E. Waddy, S. White, A. W. Williams, F. M. Williams, C. R. Woods.

The Edinburgh town council received a recommendation from the Lord Provost's committee on Wednesday that authority be given to conclude the conditional agreement with the Cluny trustees for purchase, at the price of £11,000, of part of the Braid Hills for the public park. They adopted the proposition.

Alterations have been made to the Wax Chandlers' Hall, Gresham-street, London, including the ventilation, which is now carried out on the Boyle system, the latest improved form of the self-acting air-pump ventilator being adopted for the extraction of the vitiated air.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII., XLVI., XLIX., L., LII., LIII., LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print. Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—J. W. D.—R. W.—S. S. S. B.—J. D. and Son.—J. S. and Sons.—J. F. and Sons.—C. and Sons.—A. G.—T. B. and Co.—R. W. B.—W. O. and Son.—J. E. and Co.

A COMPETITOR. (Too vague as the letter stands. If names are given, and your own name and address at the end of the letter, we will insert.)

"BUILDING NEWS" DESIGNING CLUB.—In reply to several correspondents, we may say that the awards of the prizes for the work done during the session 1887-8 will be announced in an early number, when the new rules and first list of subjects for competition among members will be given. Any suggestions for the improvement or development of our Designing Club should now be sent us, and we take this opportunity of thanking those who have already so far interested themselves in the Club as to write their proposals. Our only anxiety is to make the Club as useful as possible to all our readers at home and abroad.

## Correspondence.

### THE RIGHT TO REDEEM A MORTGAGE.

To the Editor of the BUILDING NEWS.

SIR,—I observe a letter from Mr. W. H. James in your last issue referring to my article on this subject in the number preceding, based upon the case of "Tarn v. Turner and Wilson." The answer to the objections raised as to a possible fraud upon a mortgagor in regard to his losing a valuable equity of redemption is, obviously, that he must not put himself in the position of the mortgagor in this case. If a man, after mortgaging his property, agrees to grant a lease of it, and on which agreement his lessee expends money, that man must either fulfil his contract and grant the lease, or take the consequences. Without the mortgagee's consent such a mortgagor cannot grant a lease which would give the lessee a clear title; and he cannot, therefore, carry out his contract. What, then, is the remedy of his tenant? In equity the tenant is regarded as holding the agreed lease as against the mortgagor; but he can have no right as against the higher title of the mortgagee. There is no way to stop in-

justice, and to get the lessee out of the corner into which he is forced by the wrongful act of the mortgagor in agreeing to do what he could not perform, but to allow the lessee to redeem the mortgage if he wishes. He clearly has an equitable interest in the property, and upon that interest by demise the Court of Appeal hold he can redeem. But the mortgagor had only to redeem the property himself first and grant the lease to have saved both the loss and the litigation.—I am, &c.,

FRED. WETHERFIELD,  
2, Gresham-buildings, Guildhall, E.C.,  
October 6th.

SIR,—Replying to the letter in your last issue from Mr. W. H. James, surveyor and valuer, of Birkenhead, he has misapprehended the effect of the judgment, which does equity to all the parties. It is true that the lessee of the mortgagor, being permitted to redeem, has the legal estate vested in him (the lessee), but he merely steps into the shoes of the mortgagee, and the estate so vested in him is subject to the equity of the redemption of the mortgagor, his lessor. The mortgagee gets the repayment of his loan, the lessee saves his valuable improvements, and the lessor, who is also the mortgagor, retains the right to redeem from the man (his lessee) who has now taken the place of the mortgagee.

To readers taking any interest in the matter, the original article in your issue of the 28th ult. should be read with this letter and that of Mr. James in your last number.—We are, &c.,  
A. AND C. HARSTON, Surveyors,  
15, Leadenhall-street, London, E.C., Oct. 9.

### THE COMPETITIONS COMMITTEE.

SIR,—Will you allow us to state through your journal that we are now preparing a revised list of those architects who have signed an agreement not to take part in any public architectural competition unless one or more professional assessors are appointed to advise the promoters? and that we shall be glad to receive the signature of those architects who have recently started in practice, or have not yet signed the undertaking, and shall be pleased on application to send them the usual printed form?

The revised list will show a very considerable increase in the adherents, in spite of the inevitable loss by death and resignation; and there can be no doubt that a large measure of reform has already been the result of the efforts made to obtain, wherever possible, the appointment of a professional referee.—We are, &c.,

COLE A. ADAMS, } Hon. Secs. of the  
ASTON WEBB, } Committee,  
9, Conduit-street, Hanover-square,  
London, W., October 10.

### GAS-BURNERS IN FLUES.

SIR,—It appears to be the habit of the British gasfitter, when he fixes a burner in a ventilating flue, with the object of getting heat, to put an ordinary burner. Will you allow me to inform him that when he wants heat, and not light, he will get a great deal more of the former, and a great deal less of the latter, by the use of a Bunsen burner, and he will save his employer about one-eighth the quantity of gas.

I should not have thought it necessary to mention this, but a large firm of gasfitters fixed an ordinary burner in a ventilating flue for a friend of mine the other day, and I have often seen it done.—I am, &c.,

CHARLES F. MOXON.

The foundation stone of Salvation Army barracks in River-street, Midland-road, Buckingham, were laid on Wednesday week by General Booth and others. Mr. Wallace, of Northampton, is architect, and Messrs. Hayward and Son, of Bedford, contractors for the building, which is to cost £2,000, hold 1,000 people, and include a Little Soldiers' Hall and quarters for officers.

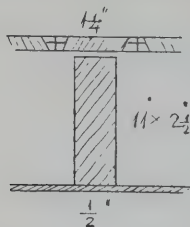
The Bishop of Exeter laid, on the 6th inst., the foundation-stone of the new Middle School for Girls, which is to be erected in connection with the Exeter Episcopal Schools' Trust at Pennsylvania, Exeter, to take the place of the premises in Queen-street, now used for the purposes of the school. Mr. James Jerman, F.R.I.B.A., is the architect, and Mr. William Gibson is the builder.



## Intercommunication.

### QUESTIONS.

[9776].—**Fir-Framed Factory Floor.**—I have just finished a fir-framed factory floor covered with 1½ in. yellow deal floor-boards, tongued with iron tongues, the ceiling of the floor below being formed by ½ in. match-boarding (V-jointed) fixed to the underside of joists. I am now told that as washing operations will be extensively



carried on here, it is essential that it should be rendered watertight. Is there any preparation which will accomplish this, or in what other way can it be done?—**DILEMMA.**

[9777].—**Weather Tiling.**—I should be obliged for a description of the best way of covering brick walls with tiles or slates, whether the tiles or slates should be hung or nailed to battens or nailed into the joints of brickwork. Also the comparative merits and cost of 9 in. brick walls hung with tiles or slates, and timber framing similarly treated. In the latter case, would felt be required in addition?—**CAUTIOUS.**

[9778].—**The Albo Carbon Light.**—Could anyone inform me through the medium of your valued journal, whether the "albo-carbon" gas burners generate moisture when burning, and if so, whether ordinary burners arranged alternately with the "albo-carbon" light would prevent the moisture being given out in sufficient quantity to do any mischief? The fact is, a showroom for drapery has within the last two years "spotted" a lot of valuable stuff. As far as can be ascertained, the walls are perfectly dry inside and out, and battened off and matchboarded inside to prevent any dampcoming through; the ceilings are well ventilated, and the cause of the goods becoming spotted is a mystery, and it has now been suggested that it has been caused by the "albo-carbon" light. If any of your practical readers can give me any information on the subject I shall be extremely obliged.—**IGNORAMUS.**

[9779].—**Eaves.**—I wish to build as tightly as I can against a wall, the eaves of which for 30 years have projected over my land; how near can I approach the slate? Answer will oblige.—**E. D. W.**

[9780].—**Quantities.**—Bills of quantities were prepared by the architect, and supplied to contractors, with the usual commission added in the summary. The lowest tender was accepted, and the contractor has refused to pay for the quantities, and the work is now completed. The building owner says he did not order quantities, although he left the matter entirely in the architect's hands, and told him to obtain tenders in the usual way. The architect certified for the balance due to contractor, less the amount due for quantities, but the building owner paid the contractor in full. Who now is liable for the quantities, and who ought to be sued?—**Q. C.**

[9781].—**Builders' Accounts and School Committees.**—Would some experienced reader kindly answer the following?—A sum is allowed in specification for school buildings for grates and heating apparatus, which are chosen by the committee without the builder having a voice in the matter. Can the committee pay these accounts, or must they pay the builder and leave him to settle them?—**NORTH COUNTRY.**

[9782].—**Strains.**—During the recent correspondence regarding shearing strains, "C. A. B." took an example from an examination paper of a beam supported at both ends and loaded with a number of loads. The first question he has solved correctly, but not so, I think, with regard to the shears at the loads. I have worked these out and find them to be as follows:—At  $a$   $2\frac{1}{2}$  cwt., at  $b$  16½, at  $c$  nil, at  $d$  2½. Perhaps Col. Seddon would kindly explain which is correct.—**S. E. D.**

[9783].—**Old Houses.**—I should be obliged if any of your readers could inform me if the plans of the following old houses have been published, and where:—Knowle House, Aston Hall, Westwood House, Longleat, Hatfield, Hardwick Hall, Audley End, and any others of the 16th and 17th centuries.—**STUDENT.**

[9784].—**Efflorescence.**—What is the cause of a white crystalline deposit on a new stock-brick wall? Is it due to the chemical composition of the bricks? Is there any remedy for it? Will the disfigurement be permanent, or will it wear off?—**BRISTOL.**

[9785].—**Dancing Floor.**—What is the best way to make a floor (laid in half battens widths, ploughed and tongued and secret-nailed) suitable for dancing? Should it be waxed and polished, and if so, how; or is this only suitable in the case of an oak floor?—**BRISTOL.**

[9786].—**Graphic Statics.**—Will any of your readers kindly inform me of a good work on Graphic Statics, showing its applications to strains and stresses in beams, &c., treated in a simple and concise manner?—**SELEBI.**

[9787].—**Theatre Construction.**—What is the rule for finding fall of circle fronts in a theatre? How many tiers of seats follow this rake towards proscenium opening? What is the best form of truss for fly gallery? What is the best illustrated practical book showing construction of roof and galleries? Any hints will oblige.—**ONE IN A FOG.**

### REPLIES.

[9787].—**Acoustics.**—If "Auris" will refer to my reply to "Architect" on Aug. 17, this year, he will prob-

ably find his difficulty partially met. I can well imagine the inability of the speaker to make himself heard, for the plan of the room in question has everything to perfection that could be desired to produce an echo and acoustical defectiveness in general. First, the wall facing the speaker should not by any means be flat (if it is not provided with a gallery). It ought to be curved on plan—some people say semicircular, but this is not always practicable. For my part, I prefer it to be elliptical, for sound should not meet a surface at right angles, otherwise it will be reflected back again. If "Auris" adopts anything of this kind, and makes the corners out with curved partitions, he must be careful and pug it well with non-conducting materials. There is one thing "Auris" has not mentioned—that is, the position of the entrance doors. If they are on the wall facing the speaker, it will be a decided advantage to have them very deeply recessed and covered with baize, the idea being to break the surface up as much as possible, for it helps to disperse the sound-waves. A chapel which came under my notice a short time ago had a most distressing echo. Several devices were adopted to remedy the defect, but without avail. When the increase of the congregation demanded the erection of a gallery opposite the speaker it was found that if the sound was divided or broken up, and now is entirely free from echo of all kinds. Secondly, the ceiling should not be entirely horizontal—it will have the same effect as a flat wall in front of the speaker if it is. The parts adjacent to the walls should be brought down in the form of a cove. The position of the speaker has a deal to do with making himself heard. If possible, let him stand with a wall not very far behind him. It will act as a vertical sounding-board, and throw the sound forward, which would otherwise be lost. Horizontal sound-boards overhead are not necessary for the height "Auris" names, as there is no tendency for echo to be produced from excessive height.—**R. J. ANGEL, Liverpool.**

### CHIPS.

The Carpenters' Company Free Lending Technical Library, containing some of the best works on carpentry and joinery, is now open every day from ten till four, and on Friday evenings from five till eight p.m., at the Company's Hall, London-wall. Catalogues and full particulars may be obtained by application to the librarian.

The Goldsmiths' Company have presented the buildings and site of the Royal Naval School at New Cross for a Polytechnic Institute, and will further endow it with £2,500 a year from their corporate funds. The school grounds extend to seven acres, and are within three minutes' walk of the New Cross stations. The gift is subject to the sanction of Parliament.

Among the legacies left by the late Duke of Rutland is one of £500 to Mr. Robert Nesfield, the agent of his Derbyshire estates.

New Ordnance stores are being built behind the military hospital at York. They are of red brick relieved with Staffordshire black flints, and form three large blocks. Mr. T. R. Barry, of York, is the contractor.

The old Theatre Royal at Dundee was destroyed by fire on Saturday. It had been used as a music-hall for several years, and was undergoing extensive renovation preparatory to reopening on Monday.

The London and North-Western station at Leamington is being enlarged and improved for the company, the contractor being Mr. Hinson, of Stamford.

An inquiry was held on Wednesday week at the town hall, Cardiff, before Mr. S. H. Terry, one of the inspectors of the Local Government Board, for the purpose of obtaining sanction to the Corporation expending £30,000 in laying out as pleasure grounds the Ely and Canton Commons. The Corporation had power to borrow £4,000 only.

Mr. John Lloyd, of Lancaster House, Surrey, is engaged in the preparation of a ground plan of London, showing the different estates and freehold properties within its area.

The Visiting Justices of the Lancashire Asylum, at their monthly meeting on Tuesday last, confirmed the resolution of the Buildings and Grounds Committee, adopting the plans and specifications for new workshops prepared by Mr. Ed. Howard Dawson, A.R.I.B.A., of Lancaster, and accepting the following tenders for carrying out the various works:—Builder, Mr. W. Harrison, Lancaster; carpenter and joiner, Messrs. R. L. Wright and Sons, Lancaster; slater, Messrs. Pickles Bros., Leeds; plasterer, Messrs. R. Hall and Son, Lancaster; plumber, smith, and glazier, Mr. Wm. Abbott, Lancaster; painter, Mr. G. Bleazard, Lancaster.

The town council of Tiverton have adopted the schemes of Mr. J. Siddalls, borough surveyor, for improving the water supply from a new source, and for re-sewering a large part of the town. A portion of the footpaths of the town are being relaid with granolithic pavement, under his supervision.

The foundation stone of a new Children's Hospital for Leicester was laid on Tuesday by the Mayor of the borough. The building is being erected as a wing of the present infirmary, and will accommodate fifty children.

### STATUES, MEMORIALS, &c.

**EDINBURGH.**—The members of the Clan Graham and others have erected a memorial in St. Giles' Cathedral, at a cost of £1,100, to the memory of the "Marquis of Montrose"—the "Great Marquis"—executed in Edinburgh on the 21st May, 1650, for the part he took in the Civil War. This was unveiled last week. The design, prepared by Dr. Rowand Anderson, of Edinburgh, is in the Renaissance style of the 17th century. The principal feature is a semicircular arch deeply recessed, having in the recess a sarcophagus, with black marble bier carrying the recumbent figure in white marble of the Marquis, a bronze sword being grasped in his right hand. The sarcophagus, mounted on a pedestal, is of ornate character. The archway is flanked by two Corinthian pillars in black and gold marble, with caps and bases of alabaster. In the centre of each of the pillars is an alabaster wreath. These pillars are surrounded by a frieze, entablature, and cornice with ornamented pinnacles. The frieze is decorated with floral wreaths and panels. Rising over the cornice and between the panels is a large panel, in which is quartered the full coat of arms of "The Graham," flanked by carved pillars and dolphins, and surmounted by a pediment. The back of the arched recess is divided into three large panels, formed with alabaster mouldings, and in the centre panel, enriched with carved work, has been placed an inscription. The monument measures 9 ft. across, and 16 ft. in height. Messrs. J. and W. B. Rhind were the sculptors. The window of the aisle will be filled with the armorial bearings of the distinguished relatives, companions-in-arms, and associates of Montrose, by Messrs. Ballantine, of Edinburgh, at an additional outlay of £300.

**THE SHAKESPEARE MONUMENT AT STRATFORD.**—The monumental group of bronzes which Lord Ronald Gower has presented to the Shakespeare Memorial Association, Stratford-on-Avon, was unveiled on Wednesday. The monument is erected upon a plateau in the gardens of the Memorial Theatre, and consists of a large pedestal, around which the figures are grouped, a full-length statue of the poet surmounting the whole. The figures are of heroic size. Tragedy is represented by Lady Macbeth in the sleep-walking scene; Comedy by Falstaff, who, seated in a chair, has just drained a cup of sack; History by Henry V. (Prince Hal) assuming the Royal crown; and Philosophy by Hamlet contemplating Yorick's skull. The topmost figure shows the poet seated, with a quill in his right hand, and his left thrown across the back of a chair, holding a roll of manuscript. The pedestal is of Bath stone. Regard has been paid to architectural surroundings, and the structure harmonises well with the memorial buildings. The figure is 6 ft. 4 in. in height, and the monument which carries it 17 ft., making a total height of 23 ft. 4 in. Lord Ronald Gower is the modeller of all the bronze figures and decorative parts, and is said to have been engaged upon the work about twelve years, and a French sculptor (Mons. L. Madrassi) has given him occasional assistance and advice. Four of the bronzes, including that of the poet, have been cast by Tassel, of Paris; the wreaths, masks, fruit and flowers, and the statue of Hamlet having been cast by other Parisian firms. The architects of the stone monument are Messrs. Peigniet and L. Marnez, of Paris; the local contractor for the stonework being Mr. Frederic Taylor, of Stratford.

### LEGAL INTELLIGENCE.

**A NOVEL CASE OF LIGHT AND AIR.**—An application for an injunction to restrain the defendant from erecting a building was made by Messrs. Nott, Watson, and Co. against Mr. Harrod. The structure for which the rights were claimed was a large timber store, formed with timber framing, carrying a pantile roof. The building is of large dimensions, the side next to the defendant's new building having a brick wall about 8 ft. high, and the remainder of wood, the boards 8 in. in width, with 3 in. spaces; the light inside the building being bright and clear, admirably suited to the purpose of sorting and arranging boards of various kinds. After the first hearing before the vacation judge, the parties met and agreed to terms, so that the building will proceed. Mr. H. Lovegrove was surveyor for the plaintiffs, and Mr. C. W. Stephens and Mr. A. Williams for the defendant. Thus, by an arrangement to compensate for damage, a decision in a novel case was not obtained.

New technical schools which have just been added to the group of buildings at the People's Palace were opened on Friday. There are engine rooms, laboratories, five workshops, and nine classrooms. Mr. E. R. Robson, F.S.A., was the architect, Messrs. Perry and Co., of Bow, were the builders, and Mr. J. Softley was the clerk of works.



## Our Office Table.

ONE of the last acts of the late Mr. James Sellars, before his fatal illness, was to prepare a report, assisted by Mr. James Barr, C.E., and Messrs. Henry Herbertson and Co., of the estimated and actual cost of the Glasgow Exhibition buildings. From this statement it appears that the total estimated cost of the building and grounds was £69,128, and that the final cost was £74,464. The excess of cost over estimate being £5,336, or about 7½ per cent. In addition to this outlay, there was added work done since the exhibition, making a grand total of £82,714 expended on the buildings.

MUCH comment, finding its way into the correspondence columns of the local press, has been made at Birmingham on the action of the town council on Tuesday in accepting for the stained glass to be placed in the Victoria Law Courts, now in course of completion from designs by Messrs. Aston Webb and Ingress Bell, the lowest tender. It appears that several firms of stained-glass artists forwarded schemes of designs, the prices ranging from £2,750 to £1,700, and, as might be expected of a body of enterprising townsmen elected by their fellow ratepayers, the last tender was accepted, "being the lowest." The obvious suggestion is that these works of art were selected, not for quality, but as the cheapest, and additional piquancy is given to the local protests loudly uttered by the facts that the order has not been received by a Birmingham firm, while one of the largest of these, Messrs. Winfields, were not invited to compete. There may be, and probably is, a better explanation than mere economy for this display of "Brummagem" methods of business; but rather than expend money on cheap painted glazing, it would be better policy to adopt a scheme of decoration, and order one or more lights, filling in the other windows temporarily with tinted glass.

MR. FRANCIS WEDGWOOD, grandson of Josiah Wedgwood, the founder of the firm of potters at Etruria, Burslem, and for nearly thirty years the head of the same undertaking, died on Tuesday week, at the age of 88 years. Having received a scientific training at Edinburgh, he joined his father and elder brother at Etruria in 1823, and soon made himself a thorough potter. Twenty years later, through the death of his father and the withdrawal of his brother, he became sole partner in the firm. But, finding the responsibilities too arduous for one head, he took in a partner—first Mr. Boyle, and later Mr. Robert Brown, and it was under the latter administration that the production of jasper was revived. In 1859 Mr. Wedgwood lost the help of Mr. Robert Brown, and for another ten years he worked the business with his three sons—Messrs. Godfrey, Clement, and Lawrence Wedgwood. In 1870 Mr. Wedgwood retired from business and public life, and after eighteen years of retirement, spent in public services, has died full of years and honours. He leaves three sons and four daughters.

MR. OCTAVIUS MORGAN, the well-known antiquary, and long member for Monmouthshire, has made a handsome bequest to the British Museum, the chief feature of which is a collection of remarkable clocks and watches. For fifty years Mr. Morgan was engaged in the collection of his gift. The collection includes fifty clocks, many sundials, and watches. The most important, as it is the largest and most elaborate, is a complicated instrument made in 1589 by Isaac Habrecht, one of the two ingenious brothers who constructed the famous clock at Strasburg. Eighteen of the watches claim to belong to the period 1500-1540, and bear a strong likeness to the table-clocks which they were intended to replace—although much smaller in size. The middle of the 17th century was marked by the introduction of the beautiful enamelled watches from the hands of the brothers Toutin. Of these, Mr. Morgan's series possesses several examples, some of them of wonderful brilliancy of colouring and admirable drawing, though often of small size. The sundials are for the most part of German manufacture. Mr. Morgan's bequest includes also a collection of the gilt keys of office worn by chamberlains, and ninety of the heavy

finger-rings, with the names and devices of the Popes, from about 1400 to 1550, usually called "rings of investiture."

A DEVICE for fitting iron mantelpieces to fireplaces of different sizes has been patented in the States by Mr. R. B. Thompson, of Pittsburg. It consists in fastening a lintel having a longitudinal groove in its lower edge along the back of the frieze, the lower edge being extended enough below the frieze to make the opening the desired height. Jambs having tongues on their upper ends fitting the groove in the lintel are cut to the desired length and fastened to the side columns at the desired distance from the centre line of mantelpiece. When adjusted, the wide edges of jamb and lintel are lined with fire strips.

MESSRS. P. E. CHAPPUIS AND Co.'s new catalogue of their well-known daylight reflectors is a good deal more than a mere trade list. Since 1851 the firm has done more to let light into the dark places of the earth than any other, and the valuable experience gained in the application of their inventions is most advantageously utilised in their catalogue. We have more than once been surprised ourselves at the ingenious introduction of daylight possible by the clever adaptation of the "Daylight Reflectors," and strongly advise everyone burning gas in the daytime to get Chappuis's catalogue, no matter how hopeless he may feel of lightening his darkness. Over 50,000 of Chappuis's reflectors are now fixed in London alone, and they are almost as ubiquitous all the world over as the sunshine which they so well economise.

### MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Academy. Anatomy Lecture No. 3, by J. Marshall, F.R.S. 8 p.m.

TUESDAY.—Glasgow Architectural Association. "The Art of Decoration," by Professor Baldwin Brown, of Edinburgh University.

FRIDAY.—Architectural Association. Inaugural Address by the President, Herbert D. Appleton, F.R.I.B.A. 7.50 p.m.

Royal Academy. Anatomy Lecture No. 4, by J. Marshall, F.R.S. 8 p.m.

On Saturday afternoon Sheriff Cowan laid the memorial stone of the Margaret Brough Memorial Hall, Paisley, which is being erected by the Peter Brough Trustees in connection with the Free High Church, Paisley. The type of architecture is Norman, and the building, which will accommodate 270 persons in the large hall, and 122 in the minor hall, will cost £2,000.

Mr. Alfred Darbyshire, of Manchester, has been appointed architect for the Regent-road police-station, to be built for the Salford town council, at a cost not to exceed £3,000.

A receiving order in bankruptcy has been granted in the case of Ernest Jones, of Porchester-road and Celbridge-mews, Bayswater, and Arlington-road, Castle-hill, Ealing, builder and contractor.

The Bishop of Ripon laid the foundation stone of a new vicarage for All Saints, Southport, on Monday. Mr. E. W. Johnson is the architect.

**Holloway's Ointment.**—This cooling Ointment perseveringly rubbed upon the skin, is the most reliable remedy for overcoming all diseases of the throat and chest. Quinsy, relaxed tonsils, sore throat, swollen glands, ordinary catarrh, and bronchitis, may be arrested as soon as discovered, and every symptom banished by this simple and effective treatment.

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### TENDERS.

\* Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

ASHFORD.—For paving, channelling, and metalling the Farbrace Estate, for the Ashford Local Board. Mr. J. Willson, surveyor:—

Wood, J. ... ..	£935	0	0
Hughes, J. E. ... ..	832	13	3
Howland Bros. ... ..	669	0	0
Woodhams and Fry, Greenwich ... ..	680	10	0
Joy, E. ... ..	825	0	0
Wallis and Sons, Maidstone* ... ..	610	0	0
Surveyor's estimate, £710 5s. Rest of Ashford.			

\* Accepted.

BANGOR.—For the construction of a storm overflow in the drainage system, for the city council. Mr. E. Thomas, city surveyor:—

Williams, E., Bangor ... ..	£163	3	0
Thomas, W., Bangor ... ..	161	0	0
Roberts, J., Bangor ... ..	140	0	0
Williams, W., West-end (accepted) ... ..	120	0	0
Surveyor's estimate, £110.			

BARNSTABLE.—For alterations and additions to the Albion Tavern, Thornhill-road, Barnstable, for Mr. A. Watson. Mr. A. F. Wrightson, architect. Quantities by Mr. W. Heelis, 25, Budge-row, Cannon-street, E.C.:—

Drew and Cadman ... ..	£1,723	0	0
Tatum ... ..	1,658	0	0
Pickford ... ..	1,594	0	0
Kellaway ... ..	1,580	0	0
Green and Lee ... ..	1,519	0	0
Allen and Sons (accepted) ... ..	1,336	0	0

BATLEY.—For wrought-iron palisading and gates to property on the Clayfold Estate, Batley. Messrs. Page, Spencer, and Son, Batley Carr, Dewsbury, architects:—James W., and Sons, Dewsbury (accepted).

BIRMINGHAM.—For the erection of a house at Barnt Green, near Birmingham, for C. F. Milward. Messrs. J. A. Cossins and Peacock, 83, Colmore-row, Birmingham, architects. Quantities by Mr. G. Kenwick:—

Sapcoe, W., and Sons ... ..	£1,798	0	0
Webb, W. and J. ... ..	1,760	0	0
Moffatt, J. ... ..	1,743	0	0
Gowing and Ingram ... ..	1,595	0	0
Barnsley, J., and Sons ... ..	1,480	0	0
Smith, J., and Sons ... ..	1,415	0	0
Huins, G. H., and Sons, Redditch* ... ..	1,400	0	0
Rest of Birmingham.			

\* Accepted.

BRIDGNORTH.—For the restoration of the town hall, for the corporation:—

Bradney and Co., Wolverhampton (accepted) £172 17 0 (Lowest of five tenders received.)

BURTON-ON-TRENT.—For the erection of additions to board schools at Victoria-road:—

Hodges, G. (accepted) ... .. £3,381 0 0

(The tender of E. Wigley was originally accepted at £3,221, but was withdrawn on account of error of omission of £425.)

CARDIFF.—For repairs to Atlas Works, Canton, under the superintendence of Mr. W. Eve, F.S.I., 10, Union-court, Old Broad-street, E.C.:—

Farnell, O. ... ..	£220	0	0
Bird, C. ... ..	200	0	0
Symonds, W. ... ..	195	10	0
Dunn, C. C. (accepted) ... ..	189	0	0

Rest of Cardiff.

CLAYTON.—For alterations, &c., to the branch stores, Clayton, near Manchester, for the Droydsden Co-operative Society. Mr. F. Smith, 29, Bridgewater Chambers, 6, Brown-street, Manchester, architect. Quantities by architect:—

Riley, J. ... ..	£195	0	0
Sherratt ... ..	177	10	0
Jackson, E. and C. ... ..	175	0	0
Haughton ... ..	174	17	6
Fielding, H., Droydsden (accepted) ... ..	160	13	0
Bates, F. W. ... ..	160	0	0

CONWAY.—For constructing a purifier and reroofing the retort house at the gas works:—

Dempster and Co., Eiland, Yorks. (accepted) ... £137

DROYDSDEN.—For alterations to the Gorton branch stores, belonging to the Droydsden Co-operative Society. Mr. F. Smith, 29, Bridgewater Chambers, 6, Brown-street, Manchester, architect. Quantities by architect:—

Fielding, H. ... ..	£120	0	0
Bates, F. W. ... ..	114	0	0
Haughton ... ..	103	6	0
Riley, J. ... ..	95	0	0
Jackson, E. and C., Opnshaw* ... ..	85	0	0

\* Accepted.

EDINBURGH.—For the erections of a gentlemen's cloak room, at Duddingston Loch, for the town council:—

Binnie and Scott (accepted) ... .. £105 0 0

ELING, NEAR SOUTHAMPTON.—For converting a large store into a steam roller flour-mill, for Messrs. Neave and Co., Fordingbridge. Mr. F. Bath, F.R.I.B.A., F.S.I., Crown Chambers, Salisbury, architect. No quantities:—

Sanders, H. I., Southampton ... ..	£1,432	0	0
Kite, H. I., Salisbury ... ..	1,338	19	0
Webb and Co., Salisbury ... ..	1,232	5	1
Mitchell, C., Woodfalls, Salisbury* ... ..	1,176	10	7

\* Accepted.



GRIMSBY.—For forming roads in the new cemetery, for the town council:—  
Hewins and Goodhand (accepted)... £1,389 0 0

HAMMERSMITH, W.—For rebuilding the Bell and Anchor, Hammersmith-road, for Mr. H. Brown. Mr. E. C. Beaumont, 43, Imperial Buildings, Ludgate-circus, E.C., architect:—

Holloway, G. ...	£6,280 0 0
Cocks ...	5,120 0 0
Limn ...	5,110 0 0
Lascelles ...	4,800 0 0
Hood ...	4,735 0 0
Beale ...	4,276 0 0
Turtle and Appleton (accepted)...	4,270 0 0

HARTLEPOOL.—For sewerage, macadamising, flagging, channelling, and kerbing Moor-street and Brougham-street, for the Corporation of Hartlepool. Mr. H. C. Crummack, Assoc. M. Inst. C.E., borough engineer:—

Bulmer, J., Hartlepool (accepted) ...	£281 14 0
Borough engineer's estimate, £910.	

ISLINGTON.—For alterations and additions to the Golden Fleece, Essex-road, Islington, for Mr. H. Carter. Mr. A. F. Wrightson, 26, Budge-row, Cannon-street, E.C., architect:—

Pickfork (accepted) ...	£590 0 0
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KETTERING.—For the erection of a villa residence in Headland-road, for Mr. A. Tutty. Mr. H. A. Cooper, M.S.A., architect. Quantities supplied by architect:—

Bricklayer's and carpenter's section:—	
Gibson, E. B. ...	£438 9 0
Barlow, E., Rothwell ...	417 0 0
Guins, G. ...	399 0 0
Henson, C. and F. ...	398 19 0
Henson, G. V. ...	397 0 0
Payne, W. J. ...	392 15 0
Barlow, F., Rothwell ...	885 0 0
Coltman, J. (accepted) ...	383 0 0
Rest of Kettering.	

LANCASTER.—For the erection of new workshops at the County Asylum. Mr. E. H. Dawson, A.R.I.B.A., Lancaster, architect. Quantities by architect:—

(Accepted tenders.)	
Mason:—	
Harrison, W. ...	£1,890 0 0
Joiners:—	
Wright, R. S., and Sons [E. ...	1,060 0 0
Slaters:—	
Pickles Bros., Leeds ...	483 0 0
Plumber, smith, and glazier:—	
Abbott, W. ...	382 0 0
Painter:—	
Bleazard, G. ...	49 10 0
Plasterers:—	
Hall, R., and Son ...	5 0 0
Rest of Lancaster.	

LEWISHAM.—For new machine bakery and stables at Riverdale Mills, Lewisham, for Mr. J. Wallis. Mr. H. T. Bonner, A.R.I.B.A., 29 and 30, King street, Cheapside, and Lewisham, architect:—

Kirkland Randall, Woolwich ...	£1,535 0 0
Jerrard, Lewisham ...	1,494 0 0

LIVERPOOL.—For the supply of 100 tons of 3in. cast-iron pipes, for the city council:—

Maclaren and Co., Glasgow (accepted) £4 12s. per ton.	
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LONDON, S.E.—For providing new block flooring in the infants' department of the Belvedere-place School, Borough-road, for the London School Board:—

Holloway, J. (accepted) ...	£150 0 0
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LONDON.—For the erection of three houses and warehouse in Leswin-road, Stoke Newington, for Mr. A. Hart. Mr. W. Ewe, F.S.I., 10, Union-court, Old Broad-street, E.C., architect:—

Holloway, J. ...	£3,387 0 0
Atherton and Latta ...	3,375 0 0
Higgs ...	2,990 0 0
Holliday and Greenwood ...	2,977 0 0
Stimpson and Co. ...	2,930 0 0
Johnson ...	2,912 0 0
Holland ...	2,898 0 0
Gould and Brand ...	2,885 0 0
Anley ...	2,860 0 0
Harris and Wardrop ...	2,838 0 0
Godfrey and Son ...	2,780 0 0
Jackson and Todd, 192, Hackney-road, E. (accepted) ...	2,735 0 0
Dabbs ...	2,697 0 0

\* Withdrawn in consequence of the increased price of materials between date of tender and its acceptance—viz, seven weeks.

LONDON, S.W.—For removing an iron building now on the Shillington-street site and re-erecting it on the Teoting Graveney site, for the London School Board:—

Howard, G. ...	£167 0 0
Cruwys, T. ...	160 0 0
Croogon and Co., Ltd. ...	155 0 0
Cooper, A., and Son ...	127 0 0
Karsdon, G. R., Sterndale-road, Hammersmith (accepted) ...	118 0 0

LUTON, BEDS.—For small detached house, High Town-road, for Mr. T. Barker. Mr. W. G. Fisher, Hemel Hempstead, architect:—

Cox, W. and A. ...	£374 10 0
Parkins, D. ...	337 10 0
Mardle ...	295 0 0
Long, J. ...	260 0 0
Long, A. (accepted) ...	239 0 0
Al. of Luton.	

MALVERN.—For repairing Albert Park-road, for the Malvern Link Local Board:—

Butler (accepted) ...	£298 12 0
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MONTON GREEN.—For villa residence, Monton Green, near Manchester, for Mr. W. H. Eastwood. Mr. F. Smith, 29, Bridgewater Chambers, 6, Brown-street, Manchester architect. Quantities by architect:—

Robinson, J. ...	£759 10 0
Lindsay, J. ...	750 0 0
Grady, E. ...	700 0 0
Smith and Goodwin ...	682 0 0
Harrison, W. ...	678 0 0
Cocker, J. ...	610 0 0
Moore and Sons ...	600 0 0
Chapman and Hollingworth ...	595 0 0
Brookes and Sons ...	593 0 0
Roper, E. ...	595 0 0
Burgess and Galt, Ardwick, Manchester (accepted) ...	590 0 0

NORTHAMPTON.—For outlet sluices and other apparatus, for the water committee of the town council. Messrs. Hawkesley, engineers:—

Glentfield and Co. (accepted) ...	£1,662 13 0
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NORTHAMPTON.—For the supply of sand-washers, for the water committee of the town council. Messrs. Hawkesley, engineers:—

Cochrane and Co., Dudley (accepted) ...	£86 10 0 each
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RUSHDEN.—For the erection of house and shops, for Mr. G. Denton, High-street. Mr. H. A. Cooper, M.S.A., architect:—

Allen, J., Higham Ferrers (accepted).	
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RUSHDEN.—For improvements to the Green, for the Rushden Parochial Authority:—

Bayes and Son, Rushden (accepted).	
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SALCOMBE.—For the erection of chancel, vestry, organ-chamber, and two porches to Salcombe Church. Mr. J. D. Sedding, 447, Oxford street, London, W., architect:—

A. B. C.	
Patey and Humbles, Salcombe—	
£1,653 0 0 ... £520 0 0 ...	£2,173 0 0
Triggs, Modbury—	
1,130 0 0 ... 348 0 0 ...	1,478 0 0
Farr and Son, West Alvington, Kingsbridge—	
1,100 0 0 ... 328 0 0 ...	1,428 0 0
Rabbage, Paignton—	
1,374 0 0	
Elgecombs and Harvey—	
1,569 0 0	
A.—For chancel, vestry, and organ chamber.	
B.—Porches. C.—Total. * Accepted.	

SALISBURY.—For alterations, additions, and reseating the Wesleyan Chapel, Salisbury, for the trustees. Mr. F. Bath, F.R.I.B.A., F.S.I., Crown Chambers, Salisbury architect. No quantities:—

Jerrard and Stevens, Salisbury ...	£1,710 10 0
Webb and Co., Salisbury ...	1,637 2 9
Young, W. J. and C. S., Salisbury*	1,568 7 6

\* Accepted.

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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1763.

FRIDAY, OCTOBER 19, 1888.

## SUBSIDENCES IN THE CITY.

AN eminent writer has forcibly remarked that the majority of mankind are the "victims of gravity, custom, and fear." The imputation is equally true of the authorities who control the public works of the City. With literal truth and directness, the public are the unconscious victims of the first named of these forces. We are constantly being reminded of the maxim that every convenience has been purchased at some cost. There is always a corresponding disadvantage. Our railways have conferred incalculable benefits on communities, though in crowded cities they have certainly not been an unmixed good. They have displaced a large population of the working classes, and compelled them to go farther from their work, to say nothing of the disfigurement they have caused; in viaducts across our streets, or in tunnels beneath our houses, the railway has been even more destructive of our buildings and domestic comfort. But we put up with the lesser evil for the greater good. We should like to know the fabulous amounts that have been paid by railway companies to owners of house properties in the shape of compensation in London alone. The figures would be startling enough were they possible to be got at. When our public monuments are in danger there is more damage done, and the public are losers. That the people are victims of gravity is pointedly brought to our minds by the recent newspaper reports respecting the damage alleged to have been done to various properties in the City by the excavations now being made for the terminus of the City and Southwark Subway in Arthur-street East. As our readers in the metropolis are doubtless aware, the subway has during the past year made considerable progress, and has now reached a point on the south side of the Thames in Blackman-street, Borough, not very far from the Elephant and Castle, where a station is to be formed, on the contemplated route to the "Swan" at Stockwell. From our description of the tunnels driven under the Thames and below the Borough High-street, which we gave last year, it is evident that every care has been taken to prevent accident or subsidence. The subway has been driven at a depth of 67ft. below the pavement, at which distance it would almost seem impossible that the operations of cutting through the clay and inserting the segments of iron tubes 20ft. in diameter could have disturbed the foundations of houses in the slightest degree. The alleged cause of the mischief is the work now going on at the terminus at the corner of Arthur-street East, where the hydraulic lifts are to be worked to convey passengers to and from the subway level. A platform will be formed under King William-street and along Arthur-street West. The work is now proceeding in this locality. Externally, the corner houses at the junction of King William-street and Arthur-street West are shored up, large flying shores being placed between the corner houses in Arthur-street and Crooked-lane. The external walls present a shaken appearance. No. 33, King William-street, has a circular corner, and the cracks visible over the window apertures seem to indicate settlement. Other signs of fracture occur in the cornices. It has been stated that one of the houses looked as if it had been the subject of a siege, and as if the inside had been blown out; evidence of this, however, is not apparent from the outside.

Nos. 1, 2, 3, 4, 5, and 9, Arthur-street, and 44 and 45, King William-street, opposite, are reported to be in a dangerous state; and it is also reported that in Blackman-street, Borough, a similar state of affairs exists. On Tuesday week last, Mr. Moore, a member of the Commission of Sewers, drew attention to the subsidences that had taken place and the high rental of the property, urging that some steps should be taken to protect the occupiers. Mr. Bridgman moved that the matter be referred to a committee to inquire as to the steps, if any, were necessary to insure public safety. The district surveyor has certified to the dangerous condition of two houses in Arthur-street and Crooked-lane, and, acting under the Dangerous Structures Clauses of the Act, these houses have been shored up, and their owners are called upon to pull down the cracked and sunken portions of the buildings, and to restore and rebuild them. That the buildings shored up are in a condition requiring rebuilding, there can be little doubt; they are corner structures, and have little lateral support; their walls rest partly on bressummers and shop-fronts.

While these evidences are apparent there is less ground to come to any definite conclusion as to the cause of the settlements. It would be premature to say that the subway excavations have had anything to do with them, though it is probable they may. If it be true that this portion of King William-street reposes upon made soil—of mud excavated from the Thames during the rebuilding of London Bridge—additional weight is given to the conjecture. On the other hand, during the recent completion of the Inner Circle Railway which runs along Cannon-street and across King William-street, in proximity to the houses, it is very likely some disturbance or subsidence took place. We know that the statue of King William, at the corner of that street and Gracechurch-street, had to be supported, and great precautions were taken in underpinning and carrying down the foundations of the foundations of the pedestal. Further, it ought to be remembered that the sudden application of the brakes to the trains nearing the Monument Station must cause a tremor through the ground in the neighbourhood of the Monument and the houses in King William-street. There is the further fact we have already mentioned, that the terminal subway station in King William-street is at a depth of about 60ft., and, one may suppose, quite within the virgin soil. If the owners or occupiers of the house property can point with any accuracy to the date at which the settlements occurred, some just deduction as to the actual cause of the subsidence might be drawn. Probably the district surveyor has made careful surveys of the houses from time to time, and may be able to form some opinion as to the cause.

There is another supposition that may account for the subsidence of the soil, though we have not heard of any corroboration by the actual facts of the case. The soil through which the tunnels are bored may have become drained of any water, and thereby have caused a shrinking of the clay. Excavations in soil have often this effect of releasing the pent-up water; railway cuttings, by tapping the water of the soil, have frequently caused unlooked-for mishaps within a long range, and a tunnel, by draining the soil, may operate in the same manner. The fact, however, of the subway being driven through a blue, stiff London clay, thoroughly impervious to water, rather negatives this idea. The manner the tunnels are constructed—by cast-iron rings 1in. in thickness, 1ft. 7in. in width, made up of six segments, having projecting flanges bolted together—and the method adopted by the engineer of grouting the annular space left between the rings and the clay, insures the watertightness of the tunnel. The liquid

grouting is forced in on the completion of each ring, thus filling up the space solidly. Between the rings or flanges tarred rope is inserted, which being compressed by the bolting, secures a watertight joint. The clay is generally found about 30ft. below the surface. Above the clay is a stratum of gravel of varying thickness.

The tunnels, it may be noticed in passing, are separate, one to each line of rails; under the river, at the commencement, they are superposed—afterwards they run side by side. At the Monument the latter arrangement is adopted. In Swan-lane the tunnels are one above the other, so as to be driven under the thoroughfare. At the terminal station, near the Monument, a shaft with hydraulic lift is to be provided, besides stairs, and there will be a connection made between the subway and the Metropolitan and District Railways. Another station is to be formed near St. George's Church in the Borough and Dover-street, and a third station or terminus at the Elephant and Castle. Ultimately the line is to be extended to the Swan at Stockwell for the accommodation of the Clapham district, with an intermediate station at the junction of Harleyford and Clapham-roads. The line will be worked by a cable, so that there will be no sudden application of brakes.

The condition of the Monument has been greatly exaggerated. Considerable alarm was caused by the reports of the fall of the stonework, to which circulation was given. Mr. Murray, of the Architect's department of the Corporation, made a minute examination of the structure, and has found that it has not been in any way affected by the tunneling. The column has been found to be quite vertical, and no structural weakness has been discovered. The only cause for the ill-grounded alarm was that a small portion of the carved stonework near the abacus of the column had given way, owing to the rusting of the iron bars holding it in position splitting the stone. These decayed parts have been removed, and we see that the shaft of the column is now undergoing a process of pointing in cement, for which purpose a suspended lifting scaffold is being used. The foundations of the Monument are well laid, and it is absurd to imagine that any dangerous subsidence can have taken place from the excavations at so low a level. The civic and metropolitan authorities have need to be watchful of operations that may injure public property; as to the damage done to the house property, the claimants for compensation are, we hear, numerous. The question of damages will probably come before a court of law, with which, of course, the public are little concerned.

## LAND SURVEYING.—X.

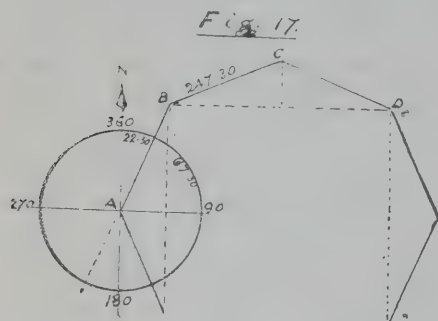
### THE TRAVERSE SYSTEM.

IN our last article we described the mode of taking the angles and lines of a town survey, and we now propose to show how blocks of houses bounded by streets running at various angles with one another can be laid down, without having recourse to through lines. Triangular and rectangular shaped plots can be surveyed and plotted without any difficulty, as we have seen: in the first case one angle and two sides, three sides, or two angles and a side are sufficient; in the latter, if we chain two of the adjoining sides, knowing the angles are right angles, we can find the other two accurately by intersection—the opposite sides are parallel; but in the case of other quadrilaterals we are compelled to divide them into triangles by chaining a diagonal, or by chaining every side and taking the angles. The system of surveying known as "traversing" is employed, therefore, when we have to survey many-sided plots or figures by chaining the lengths of the sides and taking the angles, such as we



have shown must be done in the survey of an estate across which lines cannot be chained or measured.

Let us take as an example the case of any polygon. It is required to survey a plot of land of any number of sides. Say it is an octagon, Fig. 17. The line from A in the direction of N is that of the magnetic meridian. The theodolite being fixed at A, is adjusted by making the needle coincide with the zero of the instrument. The telescope is then turned towards station B, and the angle N A B measured, which is found



to be  $22^{\circ} 30'$ . The length of the side A B is chained, and the theodolite removed to station B. Here the reading is reversed; the instrument is brought to bear on A, where a pole is fixed. The telescope is then turned on station or pole C, and the reading is found to be  $247^{\circ} 30'$ , which, being deducted from 270, the three quarters of the compass, leaves  $22^{\circ} 30'$  for the angle C B E, shown by a horizontal dotted line in our diagram, the same angle as the first line was from the meridian. The line B C is then measured, and the instrument taken to C. The angle B C E is found to be  $112^{\circ} 30'$ , which, deducted from  $180^{\circ}$ , leaves  $67^{\circ} 30'$  for the sine of half. The line C E is next measured, and so on. Now it will be observed, if the reader looks at the diagram we have given, that there are two sets of lines, verticals and horizontals, shown dotted in our diagram which can be made use of in determining the directions of the sides of the polygon. In other words, these vertical and horizontal lines represent respectively the sines and cosines of the angles made by the magnetic meridian through the stations. Thus the dotted vertical line from point B to the horizontal line running east and west is the sine of the angle at A, which measures  $67^{\circ} 30'$ . The horizontal line intercepted by the vertical is the cosine of the same angle. Hence the lines representing portions of the magnetic meridian through the station are the sines of the angles, and the horizontal lines, or "eastings" and "westings," as they are called, which are intercepted between one station and the vertical from the next, are cosines of the angles. The advantage of this system of finding the directions of the chain-lines is that it is more accurate in plotting. The accuracy of the protractor is not depended on. To take a given chain-line, its position in relation to the meridian can be found by taking from the station at which the magnetic meridian cuts it its exact bearing north, and its horizontal distance east or west; in other words, the line is the hypotenuse of a right-angled triangle, of which the distances on the meridian and horizontal lines are the perpendicular and base. Thus the position and length of any line A B can be determined by finding the "northing" and the "easting" or "westing" from the given station or point. Call A the point from which the chain-line proceeds, B its extremity; then A x will be the "northing" and x B the distance east or west—in other words, the "easting" or "westing." In plotting, these distances have simply to be laid off with the T and set-

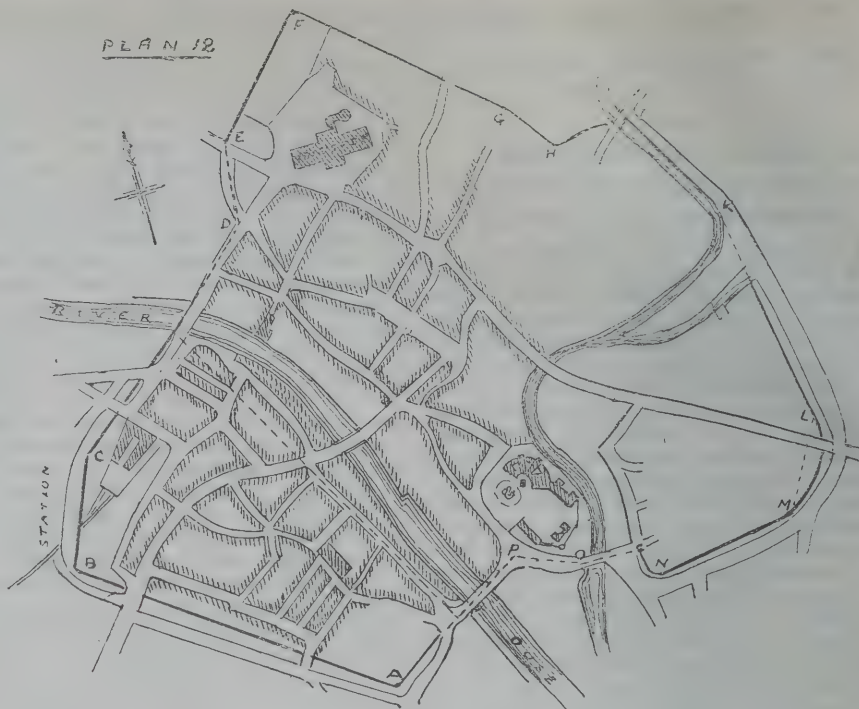
square, and the direction and length of the line A B are laid down with great accuracy.

To refer to our diagram, the line A B bears  $22^{\circ} 30'$  with the magnetic meridian, which can also be determined by finding the distance intercepted between A and the vertical from B, or the "easting," as it is called, and the length of the vertical from B, or the "northing." In the same manner B C is easily laid down by finding its easting and northing indicated by the dotted lines and the line C E is formed by its easting and southing. In going round the sides of the polygon we have therefore as many northings as southings, and as many eastings as westings. If the work is correctly plotted, the northings should equal the southings and the eastings the westings. In taking the angles with the theodolite, the following rule is observed: When the angle measured is less than  $90^{\circ}$ , we subtract the reading from  $90^{\circ}$ ; when the angle is greater than  $90^{\circ}$ , and less than  $180^{\circ}$ , subtract the reading from  $180^{\circ}$ ; when the angle is greater than  $180^{\circ}$ , and less than  $270^{\circ}$ , subtract the reading from 270, and so on. Referring to our example, we thus have the following readings:—

Reading at A =  $22^{\circ} 30' - 90 = 67^{\circ} 30'$   
 " " B =  $247^{\circ} 30' - 270 = 22^{\circ} 30'$   
 " " C =  $112^{\circ} 30' - 180 = 67^{\circ} 30'$  and so on.

It is obvious that by making these deductions the angles are found of the several sides of the angles. In an octagon the interior angles each measure  $135^{\circ}$ . For checking the interior angles of any polygon the rule before mentioned can be used; the sum of all the interior angles is equal to twice the number of right angles that the figure has sides, less four right angles. As illustrating the traverse system, we have selected the walled inclosure of York—the same method can be pursued in taking the various angles. The city wall, A B, forms a long straight line, convenient as a base, and its position with regard to the magnetic meridian is first determined. The position of the line is westerly and northerly. The other lines are taken in order. We shall now describe in detail the method of procedure.

Let us suppose the reading of the theodolite at A is  $280^{\circ}$ , then, according to the rule just given, we deduct this from  $360^{\circ}$ , which gives  $80^{\circ}$ . We chain line A B and fix the theodolite at B. The bearing on C reads  $15^{\circ}$ , which, deducted from  $90^{\circ}$ , leaves  $75^{\circ}$ . The reading of C D is  $40^{\circ}$ , which, subtracted from  $90^{\circ}$ , gives  $50^{\circ}$ . We proceed in this manner in



the order of lines round the city, at every point deducting the reading from  $90^{\circ}$ ,  $180^{\circ}$ ,  $270^{\circ}$ , or  $360^{\circ}$ , as the rule requires. In the field book the reduced angles are numbered and entered with the chainage of each line to which it refers; thus we have A =  $80^{\circ}$ , length of A B 980ft., and so on, the entries being made one after the other. By the aid of traverse tables the plotting can be quickly done. These tables give the decimal values for the sines and cosines of the angles, or the "latitudes" and "departures." Thus for each angle measured or chain line, we can find the two other right angle sides of the triangle—viz., the cosine or latitude due to the length of line chained, and the departure or vertical which corresponds to the sine. These being laid off, the chain lines can be drawn in their proper positions, &c., lengths and triangles. It is usual to draw a horizontal line at the bottom of the plan representing the plane of latitude, on which all the latitudes can be laid off for convenience, which resembles the datum line of sections. In our next article we shall give an example of this mode of plotting.

#### LESSEES' RIGHTS OF REDEMPTION.

IN our issue for 28th Sept., under the heading of "The Right to Redeem a Mortgage," we dealt with the important case of "Tarn v. Turner and Wilson" (*Times*, 1st Aug.), as decided by the Court of Appeal. This article has given rise to some correspondence in our columns, which shows that the rules of law governing Equities of Redemption are not so generally understood as they might be, and which also proves that the judgments in this case have caused a good deal of surprise in some quarters. We now propose to go back to the original hearing of the action before Mr. Justice Kekewich, and deal in fuller detail with the points of interest raised and decided, so that there may be no mistake as to what are the legal results of this leading authority.

The action was heard on 3rd March last, and the best report of it is in the *Times* for the day following; but it is also briefly noted in the *Weekly Notes* of 10th March. The actual rule laid down by Mr. Justice Kekewich was that a lessee (even at a rack rent) under a lease by the mortgagor made subsequent to a mortgage, is entitled, in case his lease is not recognised by the mortgagee to redeem the mortgage. The facts were



these: and they are important, because they may any day occur again: The plaintiff had, in Feb. 1885, obtained a written agreement for a sub-lease for a house and premises at Anerley for a term of 21 years at a rent of £150. Upon this agreement the plaintiff went into possession, and expended some £1,600 in the way of repairs and improvements. In July, 1885, the plaintiff heard for the first time that the premises were mortgaged to the defendant Turner by a demise dated in January, 1881, to secure £1,500 and interest. This mortgage was still in force, and as the mortgagee Turner had refused to recognise the plaintiff's agreement for a sub-lease which had been made without his knowledge, the plaintiff claimed as against Turner and any subsequent mortgagee the right to redeem their mortgages. It would have been useless for the plaintiff to claim specific performance of the agreement to grant a lease by the defendant Wilson, for the lease itself would have given him no better title than he had already, because Turner, as mortgagee, could have ejected him, as the lease was made after the mortgage, and without his consent. The plaintiffs did try, as an alternative claim, to make Turner specifically perform the agreement for a lease on the ground that he had adopted it. But Turner, as mortgagee, could not be compelled to carry out an agreement entered into by his mortgagor, and to render himself liable for the plaintiff's improvements. Here there was a dead lock, caused entirely by the conduct of the defendant Wilson in granting the plaintiff a lease of property which he had no right to lease, and suppressing the fact of its being mortgaged. If Wilson had himself redeemed the premises he could then have granted the lease to the plaintiff, as agreed; but as he did not, or could not, do this, the only other way in which justice could be done was by letting the plaintiff stand in the shoes of the mortgagor and redeem the property in which he had so clearly an equitable interest as a lessee who had made improvements.

The arguments in the Court below were instructive and interesting. Counsel for the plaintiff based their case upon the broad ground of principle; those for the defendant urged that such a thing had never been done before. They were strong in their one point that there was no direct authority. But after all there must always be some bold beginner, or a precedent would never be created. Mr. Justice Kekewich was not frightened by the absence of authorities for the plaintiff's contention, and as there certainly were none against it, he was left to decide the case upon principles, enlightened to some extent by dicta of Lord Mansfield and Sir George Jessel. He laid it down that the very existence of an equity of redemption was founded in the first instance upon the form taken by a legal mortgage of an absolute conveyance of freeholds with a proviso. Courts of Equity had long established that the real contract of the mortgage was a security for the repayment of money, and that if the principal and interest were repaid, the mortgagor could get back his property. This right the Court construed into an interest in the land itself, and it had come to be commonly known as the equity of redemption. But it followed from this position that both mortgagee and mortgagor had a species of property in the land with which each could deal as he liked. The mortgagor could sell his equity or transfer his interest therein by way of assignment or demise. Whichever way he did this his transferee must acquire the right to redeem. It had been held that this rule applied to any estate of freehold granted by a mortgagor out of his own equity; but it was now argued that the application did not include leases for years. In the judge's view this would be an entire contradiction of the

whole principle underlying an equity of redemption and the valuable interest it gave a mortgagor in the property.

Coming to the question of authority, Mr. Justice Kekewich noted a remark of Lord Mansfield's, that in a case where a lease has been granted in this way, if the lease is beneficial, "the tenant may place himself in the position of the mortgagor, and either redeem himself or get a friend to do it." In another case, Sir George Jessel, when at the Bar, argued, and Lord Hatherley, as presiding judge, agreed, that "any person who is entitled to an interest in any part of the land may redeem." Acting, therefore, upon these data, and the broad basis of principle, which is well known, Mr. Justice Kekewich held that there was no reason why the rule as to redemption should not apply to the case for tenancy for years, which was an assignment of a partial interest earned out of the mortgagor's property. The Lord Justices, as we showed in our former article, affirmed this decision, and adopted these views, laying down the law in even broader terms. Thus, Lord Justice Lindley said, "no distinction can be drawn between a person claiming as assignee of the mortgagor in any other way. The lessee from a mortgagor, was a person interested in the equity of redemption, and, therefore, was entitled to redeem." Nothing could be clearer or more comprehensive than this plain proposition; and it was supported by other arguments in the Court of Appeal. Unless the lessee were allowed to redeem in this way, he could be ejected by the mortgagee, and so lose the whole benefit of his lease and his improvements. Of course, the plaintiff's position was the same as if the lease had actually been granted him for 21 years, because equity looks upon what is agreed to be done as in fact done, and so the agreement stood as a lease.

It was objected by one of our correspondents that the decision would open up the way for possible fraudulent connivance between tenants and mortgagees. But beyond the answers already given to this, it may be pointed out that the opposite view would enable lessees to be ruined by fraudulent connivance between mortgagors and mortgagees. In this very case, if the Court had refused to let the plaintiff redeem, he might have lost his lease, and also all the money he had spent upon improving the property. Suppose the mortgagee had foreclosed, the plaintiff's expenditure would all have been thrown away, and his lease made worthless. Clearly the benefits of his improvements belonged to the lessee, and how else was he to get them but by being let in to redeem?

As to the view of another correspondent, that the lessee takes the position of the mortgagee, and leaves the lessor still as a mortgagor with a right to redeem, we can only say that this was not the ruling, nor is it the effect of the Judgments of the Court of Appeal. Lord Justice Cotton distinctly held that the plaintiff was entitled to all rights appertaining to the owner of the equity of redemption, including the "right to redeem." But it might be that if the original mortgagor could show that there was any value in the equity of redemption beyond the mortgage, and the lessee's improvements at the time it was so redeemed by the lessee: this latter would so far hold that balance of value in trust for the mortgagor, who had only, in fact, assigned him a portion of his whole interest in the equity in the form of a term of years. However, it must be remembered that whatever loss may fall upon the mortgagor in regard to his equity is the direct consequence of his own conduct in agreeing to grant a lease when he had no legal estate, and in suppressing the fact of the prior mortgage from his improving lessee.

#### SUBSTITUTION OF MATERIALS SPECIFIED.

THE Exeter Asylum Committee is apparently in difficulties with its architect and contractors. At the town council meeting on Wednesday week, the Asylum Building Sub-committee reported that they had visited the reservoir and saw that five men were engaged cutting out small pieces of the asphalt bottom. This circumstance gave the committee an opportunity of examining the concrete beneath the asphalt and of taking a small sample, which sample they did not think was good. They also found that between the concrete bottom and the wall of the tank there was a small space of about  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. The committee were not able to say what the result of the work now being done might be, but could not refrain from remarking that this patching of a new work ought not to be required. The committee had reason to think that the bottom of the tank was not of Claridge's asphalt, as required by the specification. They also reported that water from the roof found its way to the inside of the tanks and ran down over the walls in many places, and on examining the roof they found the cement covering cracked in many places, and not more than  $\frac{1}{2}$  in. thick in a part which was broken up, of which they took a sample, whereas the specification provided that the cement rendering on the top should be  $\frac{1}{2}$  in. in thickness. The clerk was directed to call the attention of the architect to the substitution of another kind of asphalt from that specified, and to ask him why such a substitution was made without the knowledge or consent of the committee. The architect was also requested to report upon the thickness of the cement on the roof of the reservoir. A letter had been received from the architect in reply, in which he said that Mr. Phillips, the contractor, employed Bradshaw to lay the asphalt. On learning this he informed Mr. Phillips that Claridge's was mentioned in the specification. He thereupon guaranteed this to be equal to Claridge's, and as he (the architect) knew that Bradshaw's was very generally used in Exeter, both by the council and privately, and remembering the disposition of the council to employ local people as far as possible, he thought there would be no objection to allowing the asphalt to remain. The architect evidently had a better opinion of Claridge's, and having specified for its use, he lacked firmness with the contractor in not insisting upon the terms of his specification being acted upon. But he informed Mr. Phillips that the work of any faults or defects would entirely rest with him, as being the best way of proving his guarantee of the asphalt to be correct. There was no concrete specified on the roof of the reservoir, but a rendering of Portland cement  $\frac{1}{2}$  in. thick. This he found to be about  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. thick, and at his (the architect's) last visit Mr. Phillips was adding more rendering so as to bring it up to the thickness as specified. With regard to the asphalt, the architect had been requested to report to the committee whether the leakage in the reservoir was in any way attributable to defects in the asphalt, and the whole matter would be further considered when the architect's report had been received. The committee also directed the architect to be informed that the sample of cement taken by the building sub-committee from the roof of the reservoir was but  $\frac{1}{2}$  in. thick, and that the committee were of opinion that cement laid on in coats was not equal to cement laid down in conformity with the terms of the specification. The *Western Times* of Oct. 11 comments very severely on the matter as follows:—

"The specification required that Claridge's asphalt—well known to builders for its durability—should be used, but this asphalt was not Claridge's, and the committee had to ask the architect the reason why another sort was substituted for it. The architect's reply is a curiosity in its way. It would seem that the contractor did not feel bound by the specification to use Claridge's asphalt. He preferred to depart from the bond, and to use another kind—Bradshaw's—which he believed was equal to the one specified. The council and the architect had said—Use Claridge's. No, said the contractor, I will use one quite as good. The contractor should be a judge of this sort of material, and we are not inclined to dispute his opinion. Bradshaw's may be better than Claridge's—but why depart from the terms of the contract? Why incur the possible risk of having to do the work over again at his own cost with the specified article? However, he chose that line, no doubt from laudable motives. The architect discovering the change which had been made, called the contractor's



attention to the specification, and then learned that the contractor had a high opinion of Bradshaw's asphalt. We cannot but think that the architect should have set the contractor right as to the point. The contractor had no option in the choice of asphalt, and the architect had simply to tell him so and to have reported the fact to the committee, who would have seen that the right asphalt was used. But the architect sanctioned the contractor's doings for reasons set forth in his letter to the clerk to the visitors, guarding the public interest, as he thought, by telling the contractor that he would be responsible for making good any defects that might arise from the use of Bradshaw's. It is quite possible that some of the faults which have unfortunately been discovered in the reservoir are due to this asphalt being used. But that is an open question, and the committee are now requesting the architect to report on that point."

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XV.

By HENRY LOVEGROVE, F.S.I., Surveyor.

### AN ISOLATION HOSPITAL (CONTINUED).

A CORRESPONDENT, "J. R. G.," refers to a section published some weeks since, and the answers will interest others who are following these papers from week to week.

One question is:—What is the principle upon which the labour to beds and joints is computed in connection with stonework? Are they measured on the supposition that the stone shall average a certain height in the courses and of a certain average length? Also, is it right to allow two beds and two joints to each stone, or only one?"

I answer that there is no supposition at all in the matter; the surveyor carefully considers what sized blocks of stone will be required for the execution of any portion of the work, and then proceeds to take it the extreme size as cube stone. Then take a bed and a joint to each stone by the foot superficial, and afterwards take all other labours, such as sunk face, moulded face, &c.

The other question refers to window and door openings. Deductions are made for window and door openings, as in last week's issue, and nothing is taken for extra labour to reveals.

I started the dimensions of the hospital by taking the digging and concrete to all the walls (see p. 398 *ante*), and having taken the dimensions of the filling-in under paving, took the wood-block flooring and tile paving.

This work, completed the dimensions taken, for the concrete came in again for the brick-work. The footings are taken first, then the walls above footings, taking care that your dimensions are entered so that they may be easily followed when referred to either to answer questions during the progress of the work, or at the measurement of variations at the completion of the work. The facings are taken by the foot superficial; the general deductions, if any, follow deductions for doors and windows, being usually taken with the doors and windows (see p. 490 *ante*).

When taking the facing, it is convenient to take any brick projections, such as pilasters, cornices, strings on plinths. With the dimensions of walls should come the damp-course, and all matters connected with the fireplaces can be taken together (see p. 435 *ante*), such as the jambs for the opening, the chimney bar and arch, the hearth and trimmer arch, the stone, and setting the chimneypiece and fixing. The dimensions of glazed bricks follow, and will explain themselves.

The taking of the "Tiler" I have fully explained previously; and work to the roof, such as gutters and rain-water goods, can easily be followed.

The dimensions of the drainage require very little explanation, and we pass on to the deductions in bricklayer for doors and windows. It is a good plan, as here shown, to complete all the work in connection with the window, as much time is saved and repetition avoided, and when there are many windows of one size the "timing" can be more easily and accurately done.

N.B.—Clause 18 of Specification is incorrect, as the lintels described would not suit the detail—a reference to the dimensions will show that it should read:—

18—*Chimney Openings*.—The fireplace openings are to have 2in. by 3in. wrought-iron chimney-bars, with ends split and turned up and down, the arches over of glazed bricks, the shelf of Bath stone 12in. by 3in., cut and pinned into wall with moulded front edge, and returns

carried on stone brackets, 4in. by 9in. by 6in., moulded and carved on front and pinned into wall. The hearths to be of glazed tiles, and the fenders of glazed stoneware.

#### DOORS—GROUND FLOOR.

	ft. in.	ft. in.	
4	4 0		
4	10 3	164 0	1 B. } Deduct doors to wards.
4	8 6		
4	10 0	140 0	1 B. }
6	3 7		
6	9	16 2	Extra to cut and rubbed gauged segmental arch in red bricks.
6	3 9		
6	9	16 11	
6	3 7		
6	9	16 2	Centre to do.
4	2 0		
4	10 0	80 0	Deduct extra to red brick facing.
6	4 0	24 0	Circular fair cutting in red brick facing.
12	9	9 0	Fair cutting for skewback.
6	5 0		
6	4 1/2		
4	4	3 9	Fir lintel
4	6		48 Deal joint bricks.
6	5 3		Frame b. and p.
4	9	23 8	Extra to ro. relieving arch in cement over lintel.
4	4 0		
4	6 3	100 0	Deduct R. F. S. and twice C.
4	25 0	100 0	4 by 3 fir framed rebated and bedded frame.
4	4 0	16 0	4 by 3 fir framed do., rebated and bedded transom.
4		8	Iron dowels and mortises in fir and stone.
4	3 3	13 0	3 by 2 deal moulding, planted on face of transom.
4		8	M. returned ends.
4		4	Wrought-iron frame and case-ment, a. b. 3ft. 3in. by 2ft. 6in., and (4) o.s. and (4) twice varnish the other.
4	3 3		Lead lights and glass, and glazing in iron.
4	2 4	30 4	Elsley's patent fanlight opener as before.
6	3 3		2in. deal moulded and flush half glass door, the lower part in 4 panels, the upper filled in with moulded wide sash-bars, forming small squares.
6	7 0	136 6	
6	2 6	15 0	Deal moulding out of 3 by 2, planted on middle rail of door.
12			Rebated moulded ends.
10 1/2			pairs 3 1/2 in. wrought-iron butts.
7			6 in. mortise locks with b.f.
7			sets plain brass finger plates, one long and one short.
5			Norton's patent door springs.
7	2 8		
7	2 4	43 7	3/4 in. small fluted plate glass in s.s.
6	16 6	99 0	2 1/2 in. by 3/4 in. fillet as architrave.
4	25 0	100 0	12 Round ends.
4	4 0	16 0	(4) frame.
6	3 6		
4	7 0	147 0	(4).
4	25 0	100 0	(4) and twice V. frame.
4	4 0	16 0	(4) and twice V.
6	3 6		
6	7 0	147 0	(4) and twice V.

#### DOORS TO NURSES' ROOMS AND STAIRCASE.

2	4 0		
2	7 3	58 0	1 B. } Deduct to nurses' rooms.
2	8 6		
2	7 0	49 0	1 B. }
2	4 0		
2	1 3	10 0	Deduct R. F. S. and twice colour.
2	19 0	38 0	4 by 3 fir frame as before.
2	19 0	38 0	(4) frame.
2	19 0	38 0	(4) frame and twice V.
2	3 6		
2	7 3	25 5	1 B. } Deduct door to stairs.
2	3 0		
2	7 0	21 0	1 B. }
2	3 8		
2	9	2 9	Extra to cut and rubbed relieving arch in red bricks.
2	3 1		
2	9	2 4	Extra to flat arch in glazed bricks.
2	3 3		
2	9	2 5	T.P. 9in. soffit.
2	3 1		
2	9	1 6	F.C. in glazed brick facing for skewback.
8			DI. joint bricks.
1			Frame b. and p.
4			4 by 3 fir-framed rebated and bedded frame.
2			Iron dowels and m.
2			2in. deal moulded half-glass door as before.
2			Deal moulding out of 3in. by 2in. as before.
2			Returned moulded ends.
2			(4) and twice varnish.
2			(4) and twice varnish.
18 6			
3 0			
7 0			
2 3			
18 6			
18 6			
3 3			
7 0			
3 3			
7 0			
22 9			(4) do.
22 9			(4)

#### DOORS TO W.C.'S AND SINKS.

	ft. in.	ft. in.	
2	2 6		
2	6 9	33 9	1/2-brick deduct.
2	3 0		
2	7 0	42 0	1/2-brick.
2	4 1/2	1 11	Extra to C.R. and gauged flat arch in red bricks.
2	2 8		
2	9	4 0	T. P. 4 1/2 S.
4	2 6	5 0	Fair cutting in red brick facing.
4	9	3 0	
2	4 0		
2	4 1/2		
2	4	1 0	Fir lintel.
2	8	16	Deal joint bricks.
2	1	2	Frame b. and p.
2	4 3		Extra to rounded relieving arch over lintel.
2	9	6 5	
4	1 9		
4	6 9	47 3	Deduct extra to red brick facing.
4	3 0		
4	6	6 0	Deduct R. F. S. and twice C.
4	17 6	70 0	4in. by 3in. fir wrought framed rebated and bd. fir.
4	2	8	Iron dowels and m.
4	2 0		1 1/2 deal 4 panel b. b. and square doors.
4	6 9	67 6	
4	2		4 Pair 3in. butts.
4	1		4 Japanned iron thumb latch.
4	1		4 Small barrel bolts.
4	4 0	18 0	2 1/2 in. by 3/4 in. wrought rounded fillet as architrave as before.
4	2	8	Rounded ends.
4	17 6	70 0	(4) framed.
4	2 8		
4	6 9	72 6	(4)
4	17 6	70 0	(4) and twice V.
4	2 8		
4	6 9	72 0	(4) and twice V.

#### DOORS TO CUPBOARDS.

37 6	1 brick deduct.
3	Fir lintel.
2 0	Planing to fir (4) and twice V.
16	Deal joint bricks.
6 5	Extra to rounded relieving arch over lintel in cement.
6 5	Extra to relieving arch in glazed brick.
3 0	Fair cutting in glazed brick facing for skewback.
8 8	Circular do. over arch.
7 0	2 1/2 in. by 3/4 in. deal wrought rounded fillets as before.
4	Rounded ends.
1 6	Deduct R. F. S. and twice colour
23 3	1 1/2 in. deal wrought fd. jamb linings and backings.
29 6	Deal wrought door stop 2in. by 3/4 in.
33 0	1 1/2 deal moulded and square three-panel door.
2	Pair 3in. butts.
2	Mortise cupboard lock.
25 10	(4) and twice V.
72 0	Add.

#### 1ST FLOOR—DOORS.

40 6	1 brick deduct, isolation lobby.
1 6	Fir lintel.
12 9	Rough relieving arch in cement.
16	Deal joint bricks.
24 0	1 1/2 in. deal, wrought framed, double rebated jamb linings, and backings.
31 10	2in. deal three-panel moulded b.s. door.
2	Pair 3in. butts.
2	6in. mortise lock and white china furniture.
4	Set white china finger-plates.
65 8	3in. by 1in. deal wrought framed, splayed, and bd. grounds.
37 0	Deduct R.F.S. and twice C.
12 0	Deduct bold flush bead in Pt. cement.
4	S.E.
12 0	Deduct extra to flush bead in Pt. cement as skirting.
4	S.E.
39 0	Deduct Pt. cement rendering, trowelled smooth for paint and (4).
16 0	
10	26 8 (4) and twice V.
3 0	
6 4	78 0 Add.
16 5	
3	16 5 Add.



## DOORS IN PARTITIONS.

	ft. in.	ft. in.	
6	16 0	96 0	lin. deal wrought and framed jamb linings and backings. 4 W.
6	15 6	93 0	Deal wrought door stop 2 by ½.
	2 9		6 Pair 3in. butts.
	6 4	104 6	6 n. M. lock and white china furniture.
			12 Sets white china finger plates.
	16 5	98 6	3 by 1 deal wrought, framed, splayed, and beaded gds.
12	3 0	111 0	Deduct L.P.F.S. and twice colour.
12	3 1	36 0	Deduct bold flash bead in Portland cement.
12	3 0	36 0	24 S.E. Deduct extra to flash bead in Portland cement.
12	3 0	117 0	24 S.E. Deduct Portland cement trowld. smooth on lath and (4).
6	16 0	40 0	(4) and twice V.
12	3 0	228 0	Add.
12	16 5	49 3	Add.

## CARPENTER'S WORK TO ROOFS.

	70 0		2in. rounded and pd. ridge to main roof.
2	39 0		
	4 ½		Fir framed rafters.
66	17 6		
	4 ½		Add.
71	14 0		
	5 2		Add collars
2	89 3		
	6 4		Add purlin.
2	86 3		
	4 ½		Fir wall-plate.
2	5 6		
	4 ½		Deduct fir wall-plate for chimney. Memo.—Reduction of rafters equal trimming.
4	7 0		2 rounded and framed ridge to dormers.
	4 6		
	7 7		Add do.
110	5 0		
	4 ½		Fir framed rafters to dormers.
2	6 4		
	7 2		Add hips.
	78		Continue and cut ends to 4 ½ by 2 ½ rafters and (4).
	40		Add.
	12		Wrought and cut end to 7in. by 2in. hip and (4).
4	20 6		
	9 3		Fir framed hips next wings.
60	5 0		
	4 ½		Add extra rafters next wings.
2	37 0		2in. rounded and framed ridge to wings.
	9 2 ½		
128	16 4		Fir framed rafters.
	4 ½		
4	39 0		
	6 4		Add purlin.
	4		TRUSSES.
4	14 9		Fir framed principal rafter.
	6 4		2 Cast-iron king-head weighing each and (4).
	1		1 Pattern for do.
	20 6		4 Cast-iron shoe, weighing 1b. each and (4).
2	10 9		1 Patterns for do.
	1 ½		1 ½ diam. wrought-iron tie-rod and (4).
	4 H. N. and large washer.		
2	10 9		2 Extra to forged eye for 1 ½ king-rod and (4).
	1 ½		1 ½ diam. wrought-iron king-rod and (4).
4	14 9		2 H. N. and W.
	1 4		Planing to fir and (4) and V.
	7 6		4 Fir-framed wrought cleats for purlins out of 6 by 4, 9in. long and (4) and V.
2	7 0		4 3in. tooled York template 14 by 12 under ends of principals.
14	7 0		2 n. rounded and framed ridge to w.c.'s roof.
	4 ½		
	2 ½		Fir-framed rafters.
4	8 9		
	9 2		Add valleys.

ft. in. ft. in.

2	7 6		9 by 2 fir wrought framed barge-board to w.c. at back.
	1 8		2 Cut end to do.
2	7 6		(4).
2	1 8		Deal moulding out of 3 by 2 planted on face of bargeboard.
	7 6		1 M.
2	4 0		2 Returned moulded ends.
	4 ½		
2	5 0		Fir wall plates.
	4 ½		
2	47 6		Fir wall plate ceiling joists to verandah.
	4 ½		
78	6 3		
	5 2		Fir-framed ceiling joists.
28	3 9		
	5 2		Add extra length over bath space.
10	7 9		
	5 2		Add w.c.
64	7 0		
	5 2		Add to wings.
	6		6 Extra to trimming ceiling joists 5 by 2 for ventilating panels, 3ft. by 3ft.
6	12 0		3 by 1 deal wrought chd. fillet.
	24 M.		
	6		6 Perforated zinc panels and fixing in ceiling, 3 by 3.
	6		6 Boyle's patent ventilators, air-pump ventilators, and fixing on roof, including all cutting to tiling, flashing, and turning of rafters.]
2	35 0		
	4 3		Fir framed filling in to ends of verandah.
16	7 0		
	4 2		Add quarters.
2	6 0		
	4 3		Add inter-tie.
	10 0		Vertical tiling and battening to ends of verandah.
2	14 0		Raking, cutting, and waste.
2	10 0		Cutting and waste.
2	10 0		Double co. of tiles in cement as before.
	10 0		lin. deal wrought one side tongued and beaded bdg and (4).
2	14 0		
2	26 2		Raking, cutting, and waste.
	2		lin. deal, wrought one side, fascia cut and fitted between rafters 6in. wide.
2	36 2		
	6 6		(4).
2	36 2		4 by 1 wrought one side, filling in, splayed one edge above arcing.
2	38 2		
	10 0		lin. deal wrought one side: tongued and bd. bdg. as ceiling and (4).
2	8 6		
	6 6		Add next w.c.'s and (4).
4	44 8		Splayed edge to lin. bdg.
2	44 8		lin. deal, wrought one side, fascia 6in. wide plugged to wall.
2	44 8		
	44 8		Small deal moulding on face of fascia.
2	44 8		
	8 6		(4).
12	7 6		Splayed edge to lin.
	6		6 by 6 oak wrought framed posts.
	12		12 Iron dowel and M. in oak and terracotta.
	6		6 by 6 oak wrought and framed head.
6	2 6		6 by 3 oak wrought and framed wall piece.
	3in.		3in. oak circular ribs forming arcing, wrought framed and pinned with oak pins out of 2ft. 9in. by 2ft. 4in., including all heading joints as sketch, next w.c.'s.
	16		Do., but out of 3ft. lin. by 2ft. 4in. do.
	4		Do., but out of 4ft. 2in. by 2ft. 4in. do.
	12		Pieces of hoop-iron nailed to oak post and built into wall about 1ft. 6in. long.

## THE ARCHITECTURAL ASSOCIATION BROWN BOOK.

THE familiar "brown book" issued by the Committee of the Architectural Association, like other annuals, has a tendency to increase in size year by year, as fresh work is undertaken in the classes and the roll of membership grows in length. The new volume

issued to-day, in readiness for the inaugural meeting and delivery of the presidential address this evening, is no exception to the rule, the number of pages having swelled from 166 to 178. The Committee's annual report again refers in congratulatory terms to the prosperous condition of the Association, and alludes to the removal of the place of meeting from the western gallery at 9, Conduit-street, to the larger room of the R.I.B.A. on the floor above. In the Elementary division of classes, that of Design has well maintained its popularity; that of Construction shows a decided increase in number of students as well as in the amount of work contributed; and a new class, of Ornament and Colour, was successfully established under the direction of Mr. Cole A. Adams. In the Advanced division, the Class of Design had held its position, but remained stationary as compared with the previous session; that of Ornament and Colour Decoration showed a slight improvement in numbers: that of Construction was good in attendance, satisfactory in work, while the Advanced Class of Construction had increased in numbers and was very successful, a progress largely attributable to the introduction of a new feature—that of addresses by special visitors. The Class for the Study of Quantity Taking and Specifications showed a large falling off in attendance at the last, although the average throughout was double that of the previous session. The arrangement of the meetings and the course of study have been considerably altered in the new syllabus, with the aim of directing increased attention to Specification-writing. The proposed Land Surveying and Water-Colour Classes were failures, owing to the insufficient number of students who enrolled themselves; but an elementary Water-Colour will be started in the coming session. The courses of lectures on the History of Architecture were successful. Four were given by Mr. Stannus, embracing the Classic, Byzantine, and Renaissance periods, and three by Mr. Sedding on English Architecture. Thirty-three students joined, and the subjects were treated with great minuteness. The Lectures on Construction, given by Mr. Lovegrove, had a high average of attendances, and the Lectures on Graphical Statics, given by Mr. Quick, thoroughly successful, and will be continued, with an additional course, of an elementary character, on Theoretical and Applied Mechanics. During the session papers were read by Messrs. J. C. L. Sparkes, H. D. Appleton, F. T. Baggallay, T. G. Jackson, A. Oliver, Somers Clarke, R. Phené Spiers, W. H. Bidlake, F. M. Simpson, W. Cawthorne Unwin, F. R. Farrow, H. H. Statham, and A. H. Hart. Session visits were paid to St. Paul's Church and Palace Court, Kensington; the Great Northern Hospital, St. Ermin's Mansions, Westminster; Cutlers' Co. Hall, Meistersingers' Club, Court Theatre, Farmer and Brindley's Workshops, Beaumont College, Windsor; Essex County Asylum, Brentwood; and Bishop's residence, St. George's, Southwark. Vacation visits were also made to Holmbury St. Mary, Bramshill, Yattendon, Laver Marney, St. Dunstan's College, and Hatfield House. An excursion was made to Italy in the spring, to Ireland at Whitsuntide, and to Matlock in the autumn. In connection with the "A. A. Notes," the Consul scheme suggested by the new president is being developed, and a list of places worthy of study is being compiled. As to federation the committee remark:—"The endeavour to create a bond of union between the Association and provincial societies was brought to a head, and rules were passed to facilitate a scheme of affiliation. Arrangements are being made with the Birmingham, Bradford, and Glasgow societies, which will be submitted for the sanction of members at an ordinary meeting. Correspondence is taking place with other societies to the same end." The list of honours taken by members during the session is unusually long, and includes the following:—At the Royal Institute of British Architects, the Pugin Studentship was gained by R. W. Paul, and Hon. Mention by A. B. Mitchell, the Godwin Bursary by F. G. F. Hooper, the Institute Medal of Merit by A. A. Cox, the Essay Medal by H. A. Satchell, the Tite Medal of Merit by F. E. Masey, the Grissell Medal of Merit by J. M. Brooks, the Greek Travelling Studentship by R. Elsey Smith, the Edis prize by

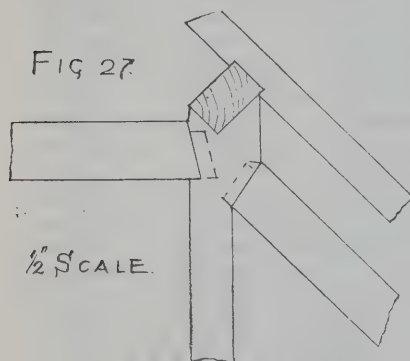


S. K. Greenlade, while 34 members passed the examination in architecture, one of whom, T. Davidson, won the Ashpitel prize. At the Surveyors' Institution F. Massie passed the examination for Fellowship, and W. L. Eves that for Associateship. At the Royal Academy the Upper School prize was taken by W. Leck, and the Lower School prize by W. Alford. At University College the Donaldson Medal was taken in Fine Art by E. A. Rüntz, and in Construction by H. Helsdon, H. R. Luck being awarded in both classes the prize; in Modern Practice, G. P. Hills and A. C. Walker were bracketed equal; and Professor Roger-Smith's prizes in Fine Art were divided equally between E. A. Rüntz and A. C. Walker, and that for Construction was awarded to J. Borrowman. The balance-sheet of the association is satisfactory: it shows a total expenditure of £853, and receipts reaching £1,054 2s., the cash in treasurer's hands being just over £200, while the estimated balance of assets over liabilities is £803 10s. The list of membership shows a total of 1,052, being an increase of 59, and the highest number recorded during the forty-six years of existence. The useful suggestions for the guidance of students are repeated in the present issue. The syllabus of papers for the present session includes papers to be read by Messrs. J. A. Gotch, A. T. Walmisley, J. L. Robinson, W. Doubleday, F. Masey, E. Radford, J. Slater, J. M. Brydon, J. T. Micklethwaite, W. A. Pite, Lacy W. Ridge, J. Starkie Gardner, and D. J. Blow.

#### CARPENTRY AND JOINERY.—IV.\*

##### ROOFING (continued).

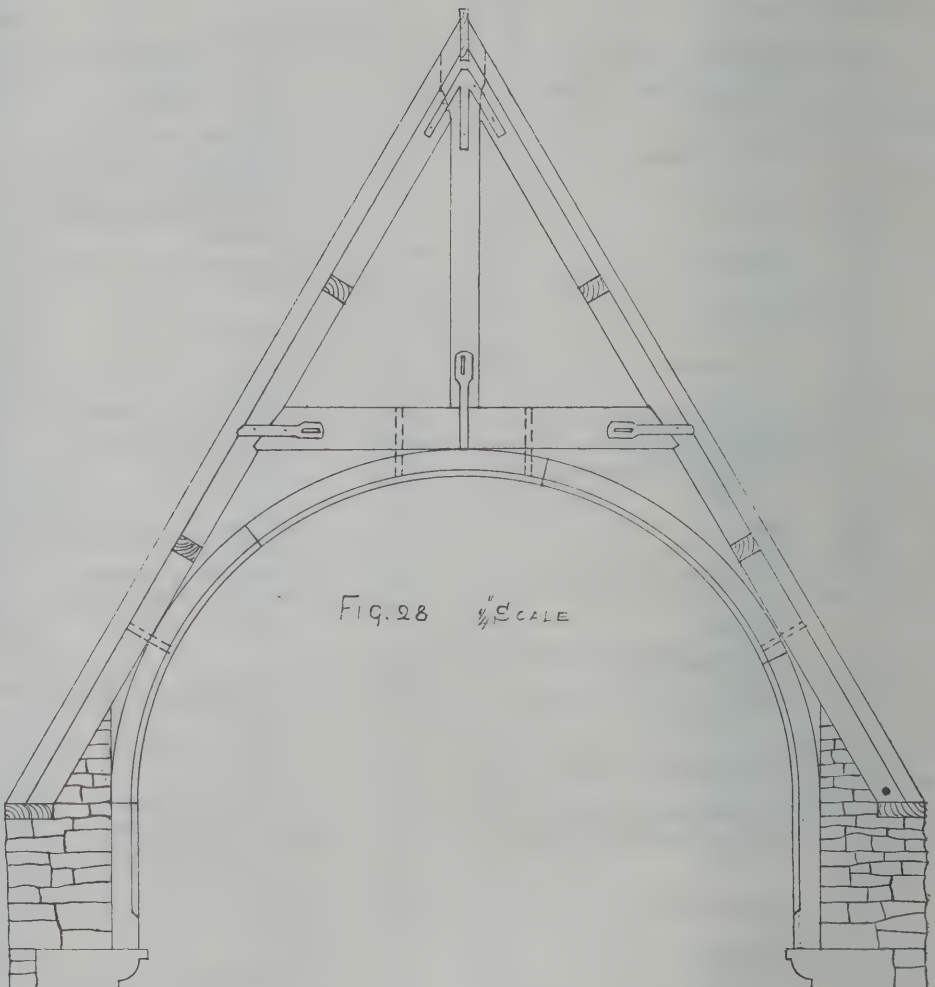
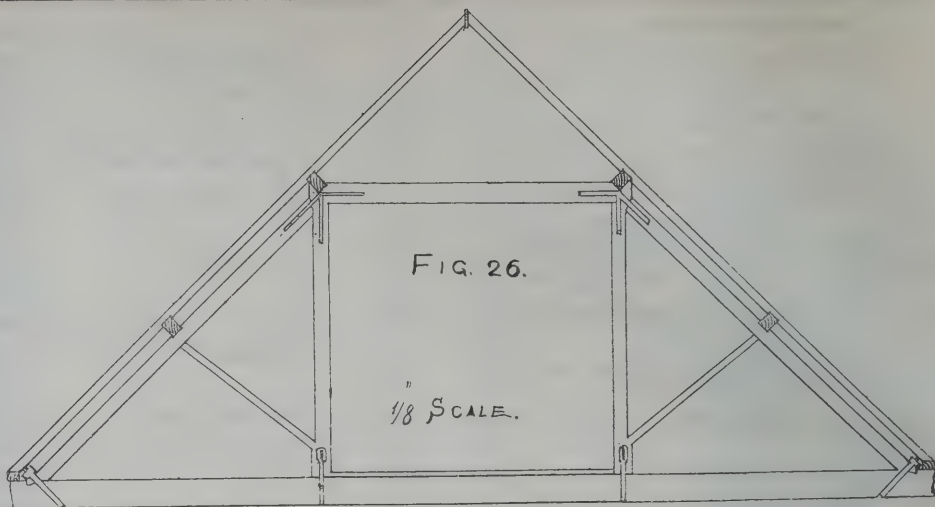
ANOTHER description of roof truss is the "Queen-Post," which differs from the king-post in having two upright posts and a hammer beam (straining beam) to keep these apart at their upper ends. This, or some modification of it, can be used for any width of building usually put up. As is seen, the principal rafters reach only to the queen-post at the top. The hammer or straining beam is let into the queen-post as shown in Fig. 27. The



dotted lines show the tenon. The bottom edge of hammer beam may rest  $1\frac{1}{2}$  in. on the queen-post; in many cases  $1\frac{1}{2}$  in. would do—this is, of course, apart from the tenon. The struts are arranged so as to give support to the principal rafter at or near where the purlins are placed. The queen-post, as seen in Fig. 27, serves to support a second purlin; the queen-post requires to be shortened at bottom similarly to the king-post (see explanation of Fig. 21) in order that the tie beam may be cambered.

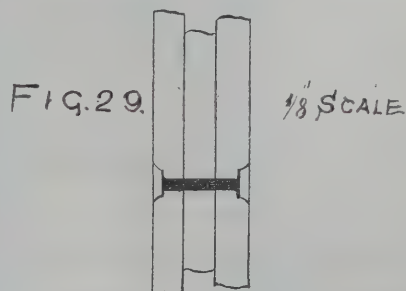
In putting a truss together, say a king-post, put the tenons of principal rafters into the mortises of king-post; next place the struts in their proper position, and then the bottom ends of principal rafters into tie beam, both being put in together, as also the lower end of king-post, which, being short, will of course require to be cramped into position by placing a powerful cramp across from the under edge of tie-beam to the crown of king-post (do not cut top of king-post to the rake of the roof until the truss is together), the cramp being kept a little to one side to allow of stirrup iron or bolt being prepared for and put on or in. The stirrup iron would be prepared for by laying it upon the beam and king-

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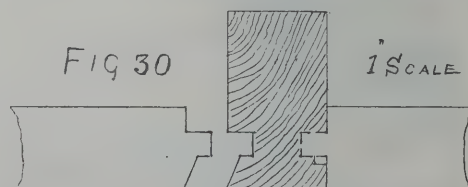


post. When these are in their right position with regard to each other, let the lower end of stirrup be fair with the lower edge of tie-beam; then mark where the mortise for "gibbs

beam to king-post; if it is thought necessary,  $\frac{1}{4}$  in. or so may be taken out of the mortise (for gibbs and cotters) towards the crown of the truss, which will allow for extra tightening; but remember the more camber is given the more the truss is contracted in width at the



and cotters" will be (slot in stirrup) and also bolt holes; then mortise and bore. This method will give the thickness of iron (say,  $\frac{3}{4}$  in. or  $\frac{1}{2}$  in.) of a "draw," thus tightening up the tie-



bottom, and allowance should be made accordingly. The queen-post truss would be put together similar to king-post, the hammer or straining beam being put in first. Sometimes trusses cannot be put together except upon the top of the walls, and in such a case there would be a scaffold alongside the tie-beam upon which



to work; this is, however, a somewhat rare case.

In church work, a curved rib is often seen (see Fig. 28). The usual way of making this is in two or three thicknesses, and breaking joint so that there will be an overlap of half the length of one of the pieces; say that 6ft. lengths would space round the curve, then, starting from the stone corbel (the rib would have a tenon wrought on each end to insert into stone corbel, being well painted previously), with three thicknesses, to form, say, 6in., there would be two pieces 3ft., and the centre-piece 6ft.; then 6ft. lengths round the curve until at the other side it would finish the reverse of how it was begun—that is, with 3ft. length in centre and 6ft. lengths on either side. These thicknesses (laminæ) would be kept together by bolts and nuts, and these might show, bolt-heads and nuts being painted, say, blue, or the bolts might be concealed, short bolts being used, sinking in head and nut and covering both by a piece of wood to match, if required to be stained and varnished. The bolt-head and nut are each  $\frac{1}{2}$ in. below the surface, and the piece of wood is glued and bradded in. The nut would be tightened with a socket key (wrench).

The rib might be got out in one thickness; in such case, two or three strong oak dowels would be inserted where the lengths forming rib come together, these being well glued in putting together. The other is the stronger and better way.

Fig. 28 shows a chamfer round the rib which is stopped near the corbels. The joints of laminæ (thicknesses) are shown, dotted lines showing where bolts could be put through, in order to tie the rib firmly to girder and principal rafters.

Fig. 29 shows how the bolting and covering up of same is done; other methods of covering could be adopted.

Fig. 30 shows how ceiling-joists might be put in, if the ceiling is to be (as it likely would) on a level with the girder. The right-hand shows the tenon and mortise; the mortises would be put in girder at distances of 1ft. from centre to centre; the other side of girder would be ploughed and worked as shown on the left-hand side, this being continued along its entire length. When the trusses are in position on the walls, the ceiling-joists would be put in by placing the tenon into the mortise in girder; then, as the groove and bevel runs right along the other girder, the joist could be put in at an angle and brought along until it would be at right angles to both trusses (its right position). Of course, at the gables (if there were such), and if there were no truss alongside gable, a wall-plate would be built in, and holes left to receive ends of ceiling-joists. If the ceiling required to be curved and sheeted with wood for acoustic purposes, provision would be made accordingly; the sheeting might run from one truss to the other, and be of such breadths as would readily suit the curve, or it might be placed parallel to the curved rib, and be sufficiently light to readily bend in order to allow of being nailed to "grounding" put up for the purpose.

#### THE DETERMINATION OF THE IMPURITIES IN WATER FOR DOMESTIC USE.

AMONG the most important of the changes brought about by recent scientific knowledge are those which have to do with the methods by which the nature of the impurities present in any sample of water are now investigated. Some six or seven years ago a school of German chemists promulgated the doctrine of pure cultivation, or the so-called "biological analysis," and the system of Koch has speedily been accepted by scientific men of all shades of opinion with a degree of unanimity which in these days is little short of marvellous. The fact is that chemists had long been in difficulties with the question of water analysis, and during the whole period that chemical tests were relied upon no satisfactory standards were devised, and no real knowledge of the influence of many of the impurities found to be present in certain samples of water was acquired. For years past it had become the fashion to notice that in certain descriptions of polluted water many of the lower organisms

were constantly present which were not to be found in water which was comparatively pure, and certainly changes, in the condition of the nitrogen which we now know are brought about mainly, if not entirely, by micro-organisms were recognised by the chemist, and tabulated in his returns.

Another disadvantage attaching to the chemical system of testing was the danger of pronouncing an adverse verdict on a source of supply on account of the accidental presence of some substance resembling in its composition the organic matters treated by the chemist as indicating previous pollution. It is a matter of common knowledge that no water, as it occurs in nature, is absolutely chemically pure. Springs are all more or less impregnated with soluble salts taken up while the water is passing downwards through the various strata, or during the period in which it is stored in the sub-soil. Rainwater, while the clouds float above us, and even at the time of its descent, absorbs particles floating in the atmosphere, dissolves gases whose presence count as impurities in the eye of the chemist, and even distilled water prepared with every precaution may contain traces of foreign substances carried over in the aqueous vapour from the still or dissolved from the surface of the condenser. Under the biological system of testing it is almost equally difficult to attain perfect freedom from extraneous matters, and purity in this case means the entire absence of all germs or micro-organisms capable of further development or growth upon, or in, a suitable medium. Liquids which comply with these conditions are said to be sterile, or free from living germs. It is possible to sterilise almost any substance by a suitable degree of heat, as it has been found, by careful experiment, that even those micro-organisms with the strongest powers of endurance fail to resist exposure to a temperature of 100° Centigrade for a few minutes. Many of the germs will stand steaming at the temperature of the boiling point of water for a considerable time; but superheated steam proves rapidly fatal to all of them.

It has been found convenient to divide the commonly occurring forms of minute organisms into two classes—viz., the pathogenic and the non-pathogenic, or those which influence or accompany certain diseased conditions of human beings or animals, and those which, so far as our present knowledge goes, are devoid of any effect upon animal life. Of the poorer class a large number of bacteria have already been identified and propagated; but so far, very few of them have been found to be present in samples of water.

The famous biologist, Dr. Koch, has, however, demonstrated the existence of the "comma bacillus," generally believed to be the specific organism of cholera, in the water of an Indian tank, and certain forms of pathogenic bacteria have been discovered in sewage water. These bacteria appear, as a rule, to live but a very short time in water, and to need for their proper development fluids more nearly allied to those found in human beings and animals. It has therefore been considered expedient to introduce these germs into various media for culture, such as meat-juice and infusion of hay, and, under the so-called system of pure cultivation, these solutions are added to gelatine to consolidate them. Many of the bacteria have the power of rendering the solidified gelatine liquid without heat by a species of decomposition, and these organisms are described as "capable of liquefying gelatine" to distinguish them from such as continue to multiply without altering the condition of the gelatine. The former are classed as injurious to health, the latter are regarded as harmless. In testing a sample biologically, a small quantity of water, about 30 cubic centimetres, is collected in a sterilised flask stopped with a wad of cotton wool. Care must be taken in collecting the water to keep the flask free from exposure to the atmosphere, and the plug of cotton wool must not be allowed to come in contact with the water. In order to make a test, a sterilised pipette, graduated to drops, is introduced into the sample, and a known quantity is withdrawn and passed under special precautions into a test tube filled to about one-third its depth with nutritive gelatine, which has been sterilised and rendered liquid by the application of moderate heat. The tube is

gently turned several times to mix the contents, and the whole is poured out on to a perfectly flat plate of glass, placed over iced water under a bell glass. The gelatine soon sets, and in the course of 24 hours the colonies of organisms which have arisen from the germs in the water may be counted. In order to count the colonies, a thin sheet of glass ruled with lines into minute squares is placed just above the gelatine plate. To calculate the number of organisms in a cubic centimetre of water then becomes a simple multiplication sum. It has become customary to express the impurity in terms of 1 cubic centimetre, and while a good sample of filtered water from the mains may yield 50 to 100 germs in the cubic centimetre, the same volume of sewage water may contain 5 to 10 millions of germs. In making these tests, it is always usual to take the mean of several experiments, from six to twelve plates being cast from each sample. Care must be taken in enumerating the colonies to distinguish between those which liquefy and those which do not liquefy the gelatine, and to specify the numbers of each.

#### CHIPS.

The bronze statue of Shakespeare presented by Mr. William Knighton, vice-president of the International Literary Association, to Paris was unveiled on Sunday. It occupies the junction of the Boulevard Haussmann and the Avenue de Messine. The sculptor, M. Paul Fournier, has represented Shakespeare standing. He wears the dress of his time, but has a cloak on the left arm, which reaches the ground behind him. The pedestal, which is of stone, is by M. Deglane. This is the first statue erected to Shakespeare in France.

The Burlington Fine Arts Club will hold, in the beginning of next year, an exhibition of the water-colour drawings of John Sell Cotman. The best drawings in the possession of Mr. Colman, M.P., Mr. Bulwer, Q.C., and Mr. James Reeve, the three principal exhibitors at the Cotman show recently held at Norwich, have been promised.

The parish church of Norton Canes, destroyed by fire in January last, is to be reopened by the Bishop of Shrewsbury on the 22nd inst. The architects are Messrs. Osborn and Reading, of Birmingham; the builders, Messrs. Treasure, of Shrewsbury; and the new organ is by Messrs. Nicholson and Lord, of Walsall.

The death of Mr. R. M. Nancarrow, clerk of works to the Corporation of Sydney in the erection of the Centennial Hall, is announced. He arrived in Australia in 1851, and for twelve years was engaged in Victoria and South Australia. In 1863 he removed to New South Wales, and, during twenty years' service under Messrs. J. Young and Williams, superintended a large amount of building work. He was also instrumental in developing the use of colonial marbles and granites, and was the discoverer of marble at Blayney and Marulan.

The Mayor of Nottingham, Alderman Turney, unveiled, on the 11th inst., a statue to the late Samuel Morley, which has been erected at the top of Market-street, Nottingham, by public subscription. The figure is 8ft. in height, and of Sicilian marble; the pedestal is of red Aberdeen granite, and 10ft. in height. The sculptor was Mr. Havard Thomas, of Chelsea.

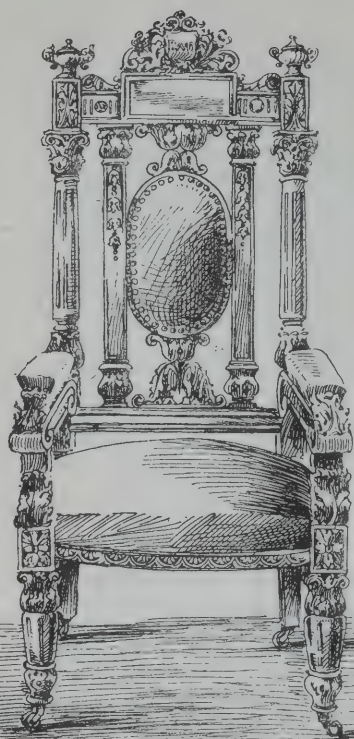
The ninth annual soirée and concert of the Edinburgh Operative Masons' Benefit Society was held on Friday evening in the Oddfellows' Hall, Edinburgh. The chairman, in commenting on the sound condition in which the society stood, mentioned that during the year they had paid away £755 in sick allowance, £6 12s. 6d. in old age allowance, and £85 in funeral allowance. Their income had been £975 18s. 11d., and they had a reserve fund of £3,772 7s. 10d.

The gasworks committee of the Halifax Corporation has appointed Mr. Thomas Holgate, manager of the gasworks at Batley, manager of the works there, at a salary of £400 per annum. The late manager, Mr. Carr, received £500. There were 38 candidates.

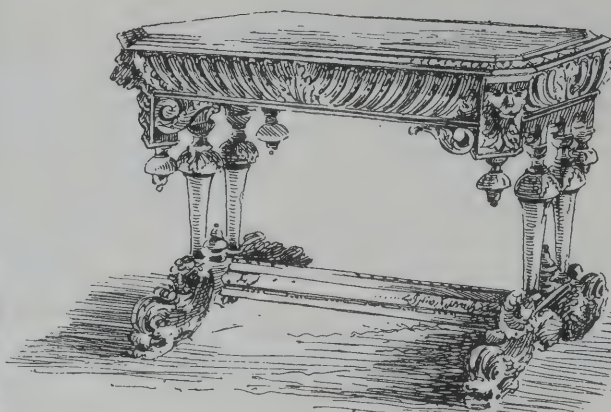
A memorial window placed in the parish church of Stenton was unveiled on Sunday. The window, which measures 14ft. by 11ft., has been designed and executed at a cost of £200 by Mr. Kempe, of London. The central feature is the Incarnation, as set forth by the Madonna and Child. To the right and left are figures of St. Andrew and St. Columba, St. Paul and St. Peter. The under portion is occupied by half-sized figures from the Old Testament.

A white marble credence has been placed on the south side of the new reredos in St. Paul's. In material and in carving it is an exact match to the superaltar. Hitherto a plain oak table had served for the eucharistic vessels.

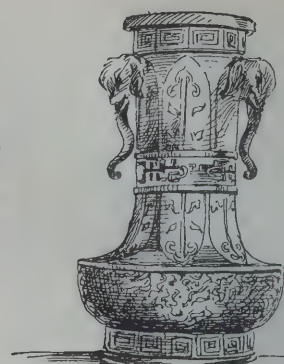




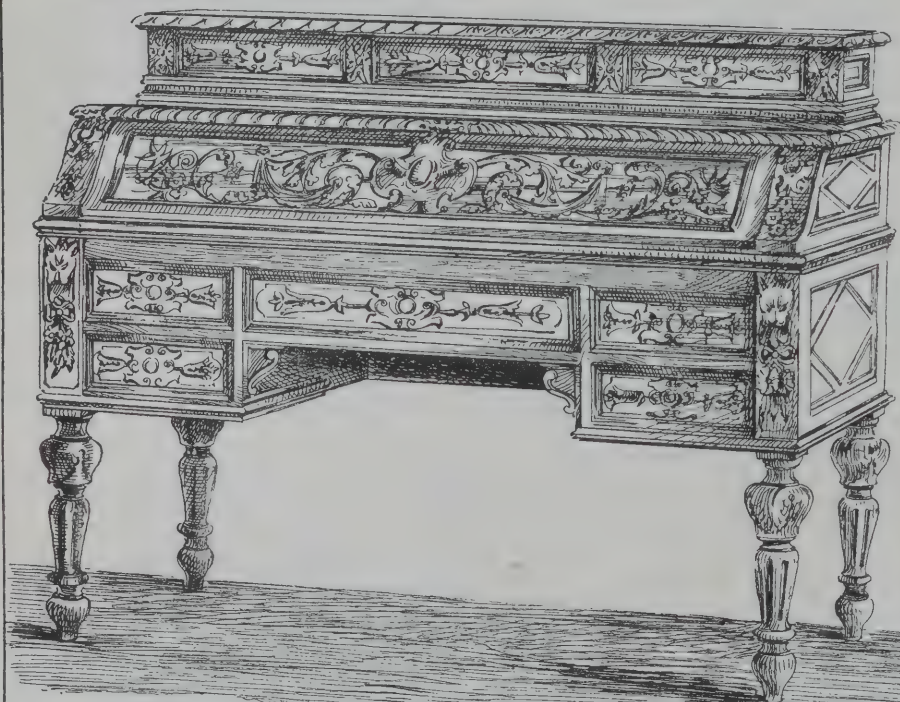
OAK · ARM · CHAIR



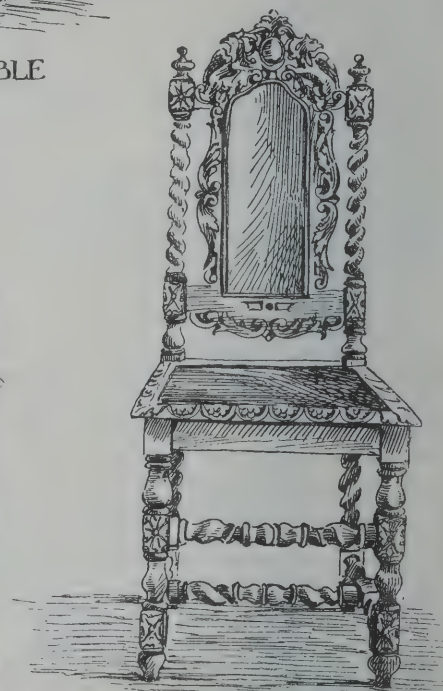
OAK · CARVED · TABLE



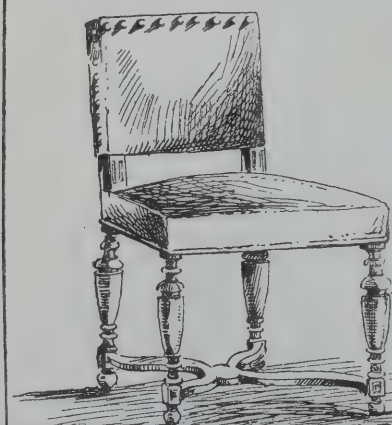
JAPANESE · VASE



ESCRITTOIRE



OAK · CHAIR



WALNUT · WOOD · CHAIR



JAPANESE · LAMPS



JAPANESE · VASE

SKETCHES OF FURNITURE AND  
DECORATIVE OBJECTS







THE BUILDING NEWS, OCT. 19, 1888.

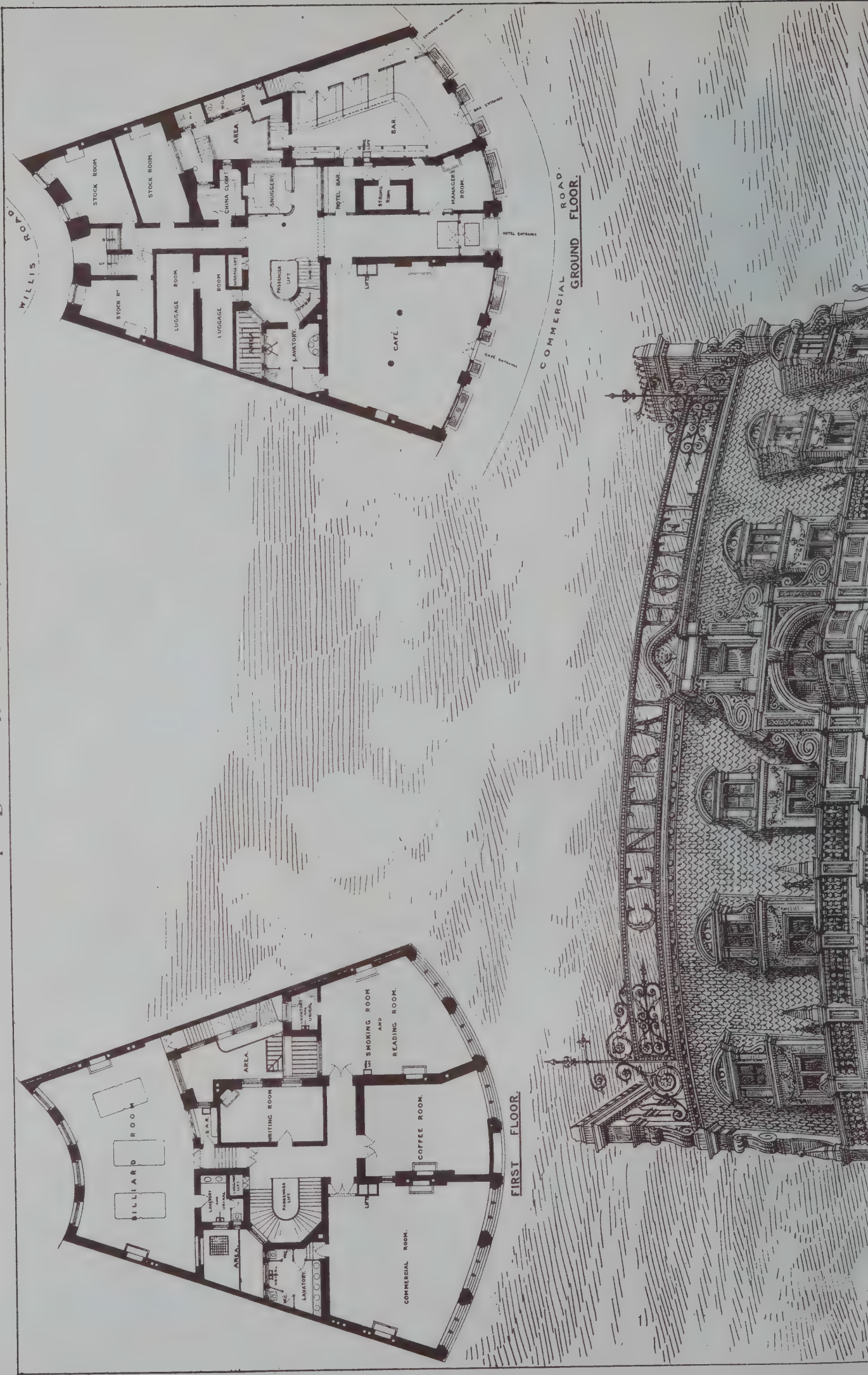






Photo Lithographed & Printed by James Akerpan, 6, Queen Square, W.C.

# CENTRAL HOTEL. PORTSMOUTH.

A. E. RICHARDSON DEL. 1883.





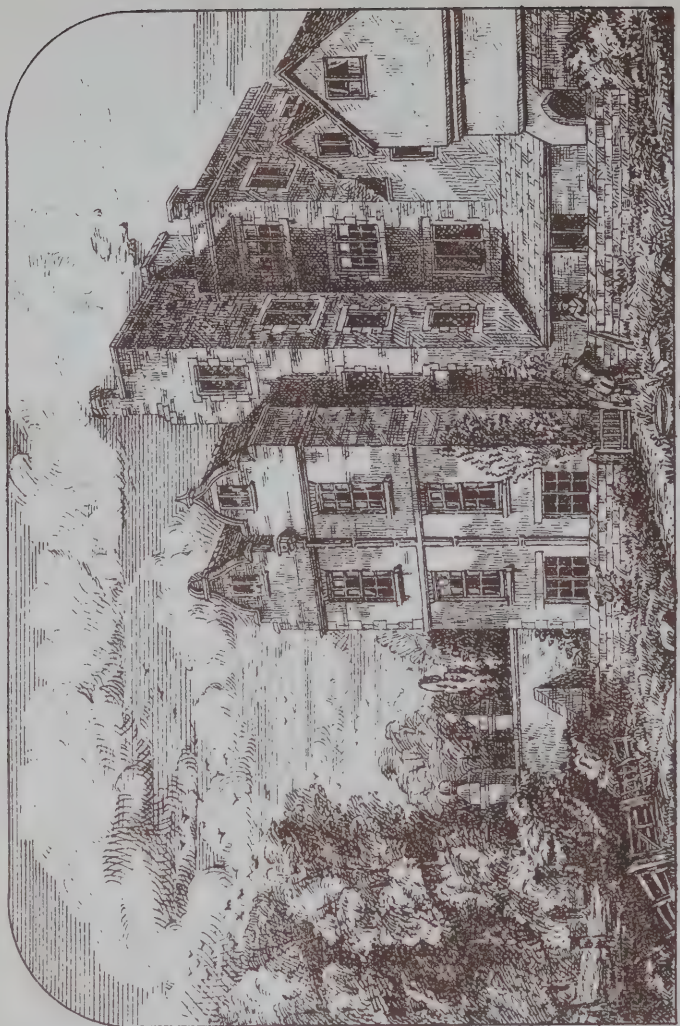








THE BARNHURST NEAR CODSALL



THE DOVER HOUSE, BREWOOD



ELSTON, BURSLEM



PULLINON HALL, PENKRIDGE







DESIGN FOR A CATHEDRAL

BY

ALONZO . P . WIDLAKES .



SCALE OF FEET .

NATIONAL BRONZE MEDAL  
AWARDED





OCT, 19, 1888.

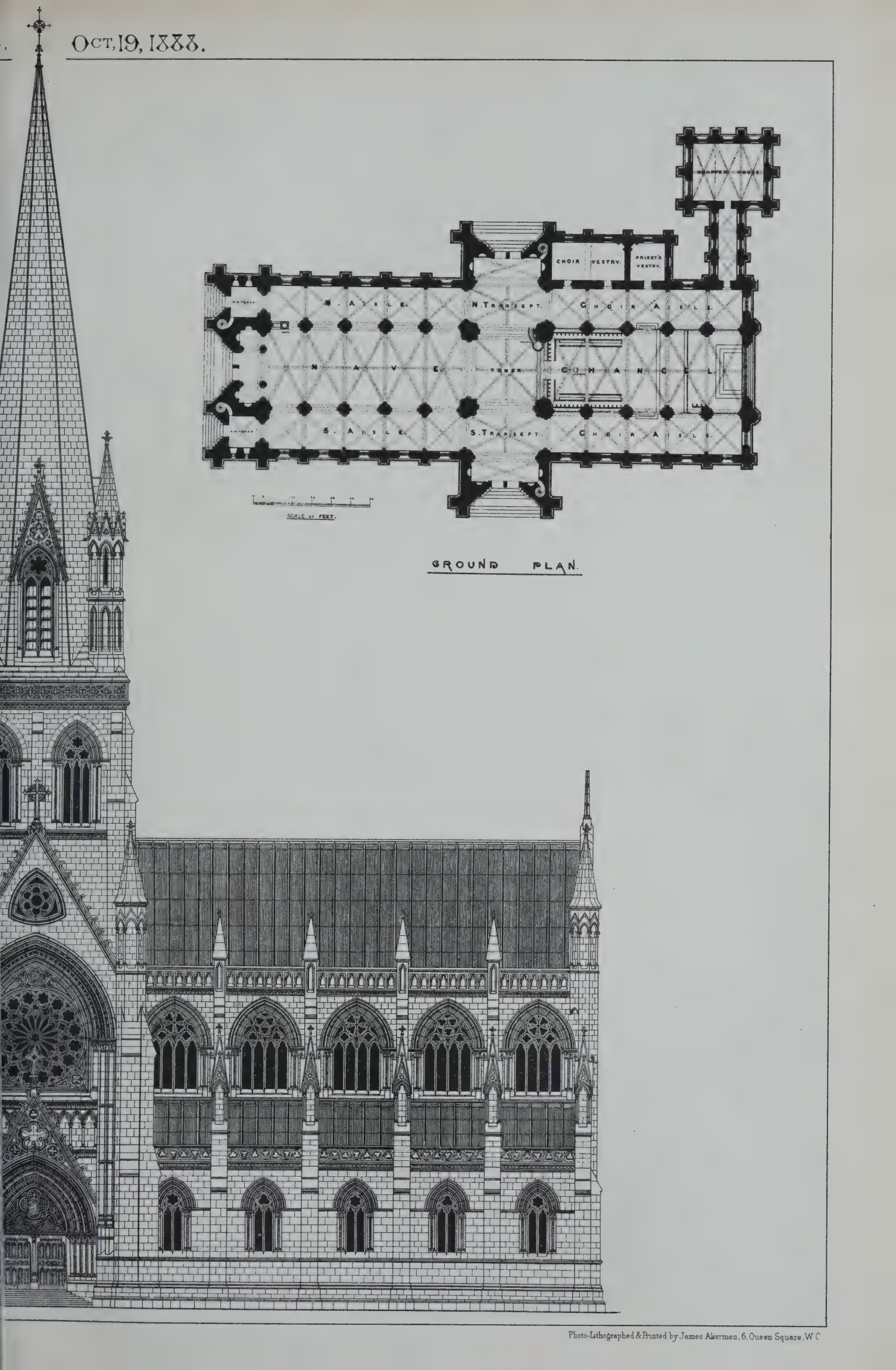
The image contains two architectural drawings of a Gothic church. The upper drawing is a ground plan, and the lower drawing is a cross-section elevation.

**GROUND PLAN:** This plan shows the layout of the church. It features a long nave with a central aisle and side aisles. The nave is divided into bays by piers. At the west end, there is a large westwork. The east end features a choir with a choir aisle and a choir vestry. A transept is located between the nave and the choir. A scale bar is provided below the plan, indicating a length of 100 feet.

**Cross-section Elevation:** This drawing shows the vertical structure of the church. It features a large central nave with a high vaulted ceiling. The nave is supported by a series of piers. The exterior walls are decorated with Gothic arches and windows. The roof is shown with a series of purlins and rafters. The drawing illustrates the structural details of the church, including the vaulting and the external masonry.

GROUND PLAN.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

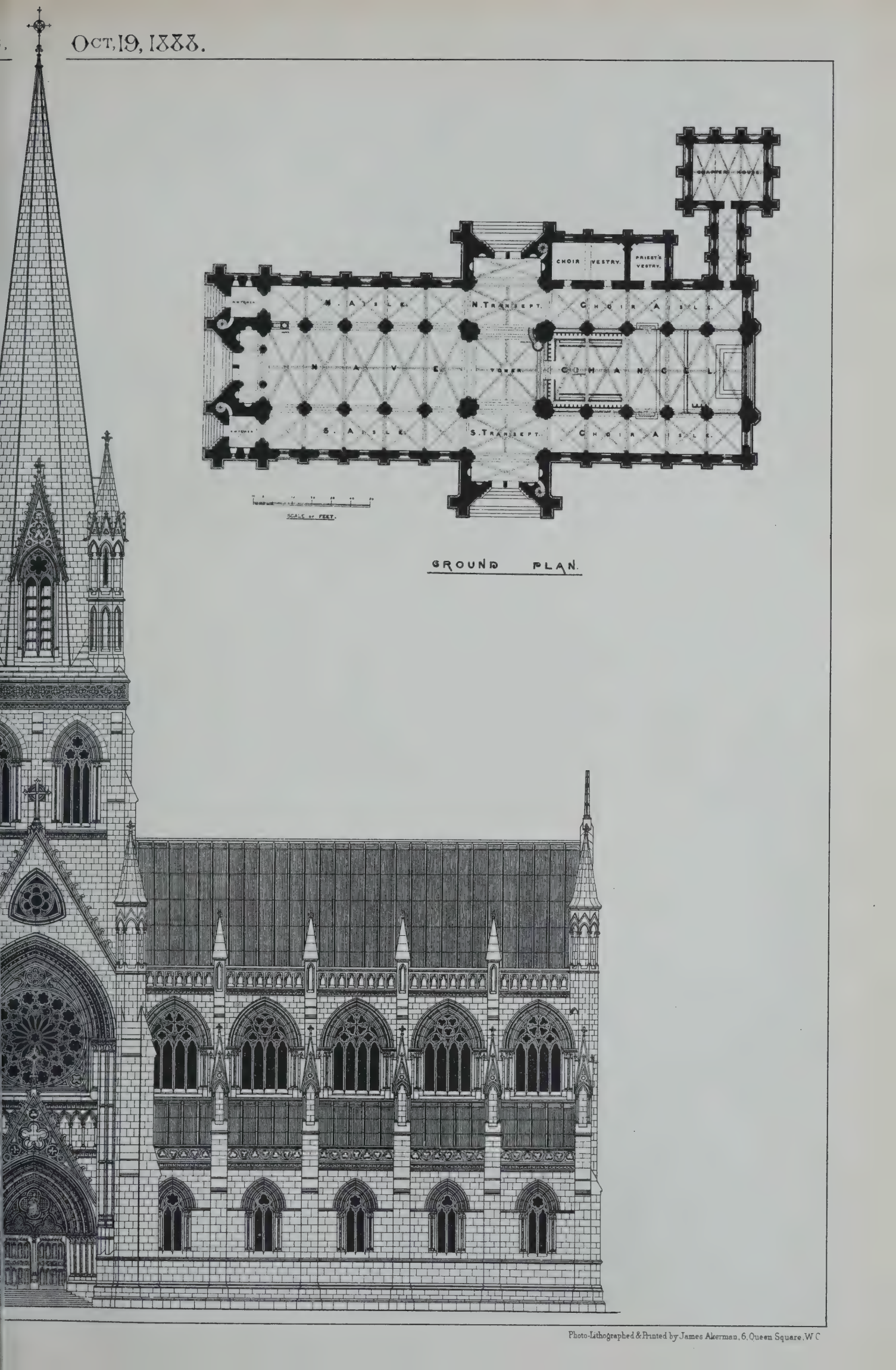


OCT, 19, 1888.

The image contains two architectural drawings of a Gothic church. The upper drawing is a ground plan, showing the layout of the church's interior. It includes a large nave with a central aisle, flanked by side aisles. The plan also shows the choir, transepts, and a small square tower at the east end. Labels include 'N. AISLE', 'N. TRANSEPT', 'CHOIR VESTRY', 'PRIEST'S VESTRY', 'CHOIR AISLE', 'S. AISLE', 'S. TRANSEPT', and 'CHOIR AISLE'. A scale bar below the plan indicates 'SCALE OF FEET' with markings from 0 to 20. The lower drawing is a cross-section elevation of the church, showing the exterior facade. It features a large central rose window, a smaller rose window to the left, and a series of smaller windows below. The drawing shows the intricate stonework and the steeply pitched roof of the church.

GROUND PLAN.

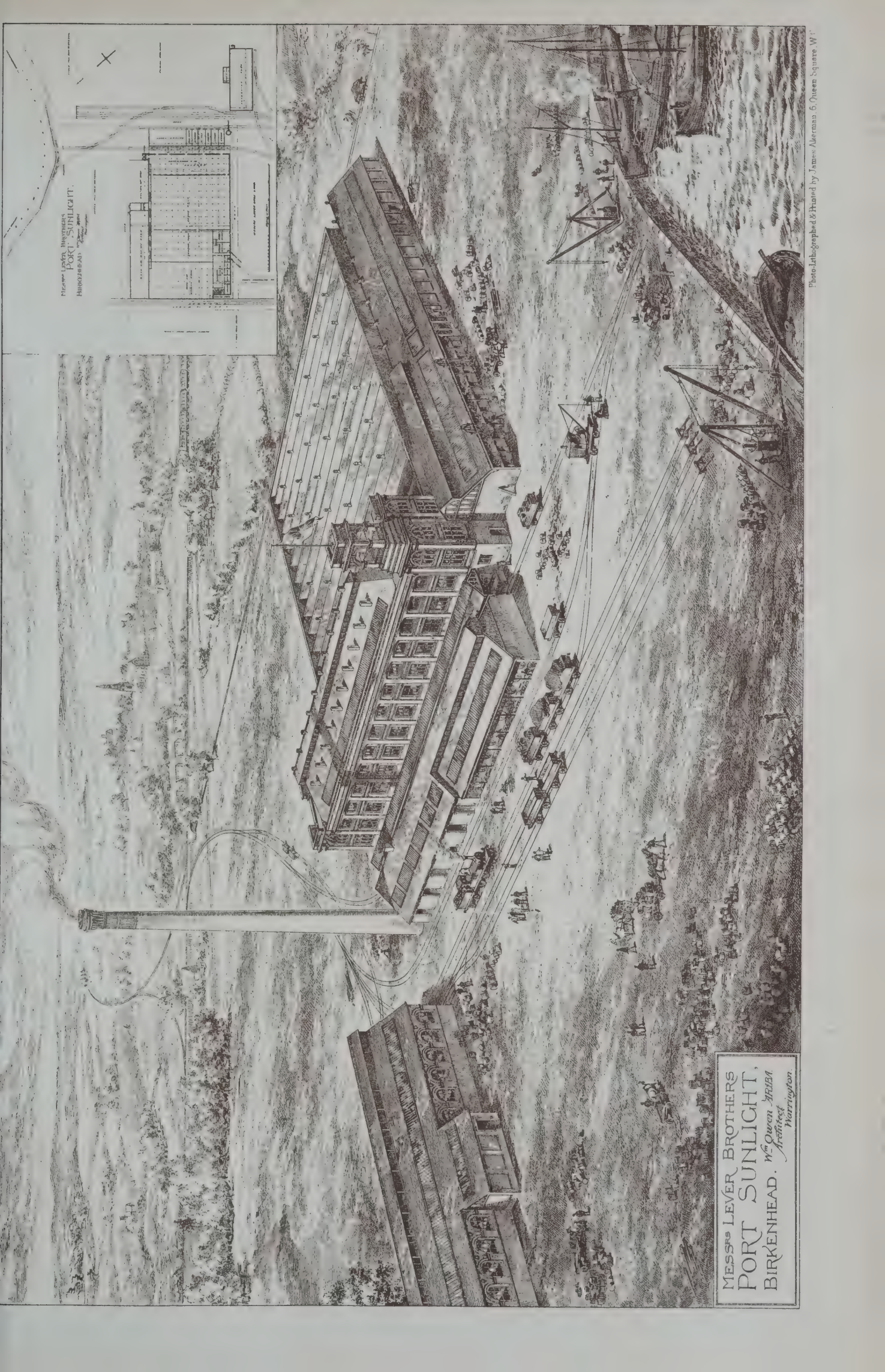
Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.











MESSRS. LEVER BROTHERS' PORT SUNLIGHT WORKS

MESSRS. LEVER BROTHERS  
PORT SUNLIGHT,  
BIRKENHEAD. *Wm. Owen & Co. Architects*  
Harrington

Photo-Engraved & Printed by James Alcorn & Co. Queen's Square W. 1.

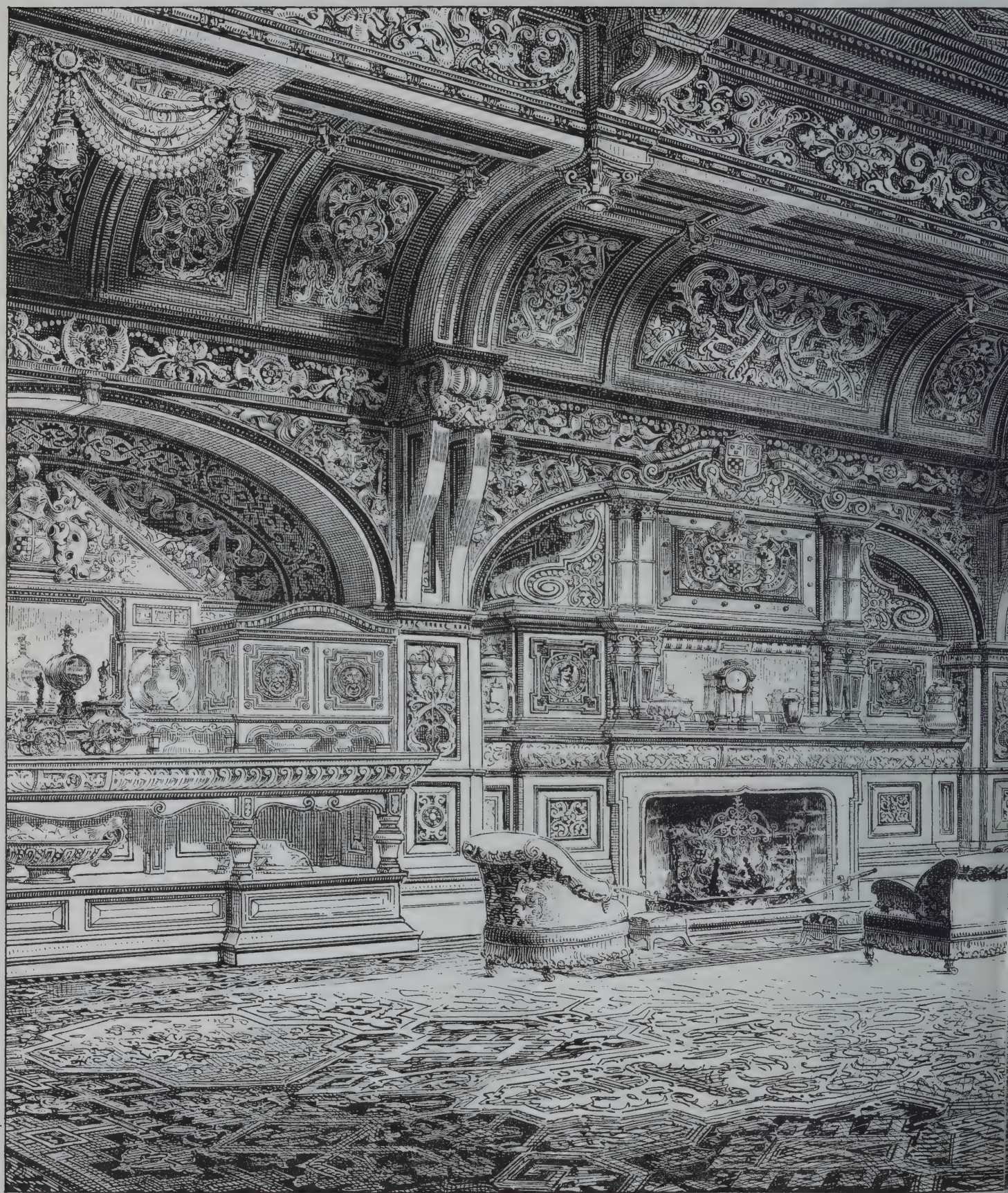














OCT. 19, 1888.



Photo-lithographed & Printed by James Akerman, 6, Queen Square, W.C.

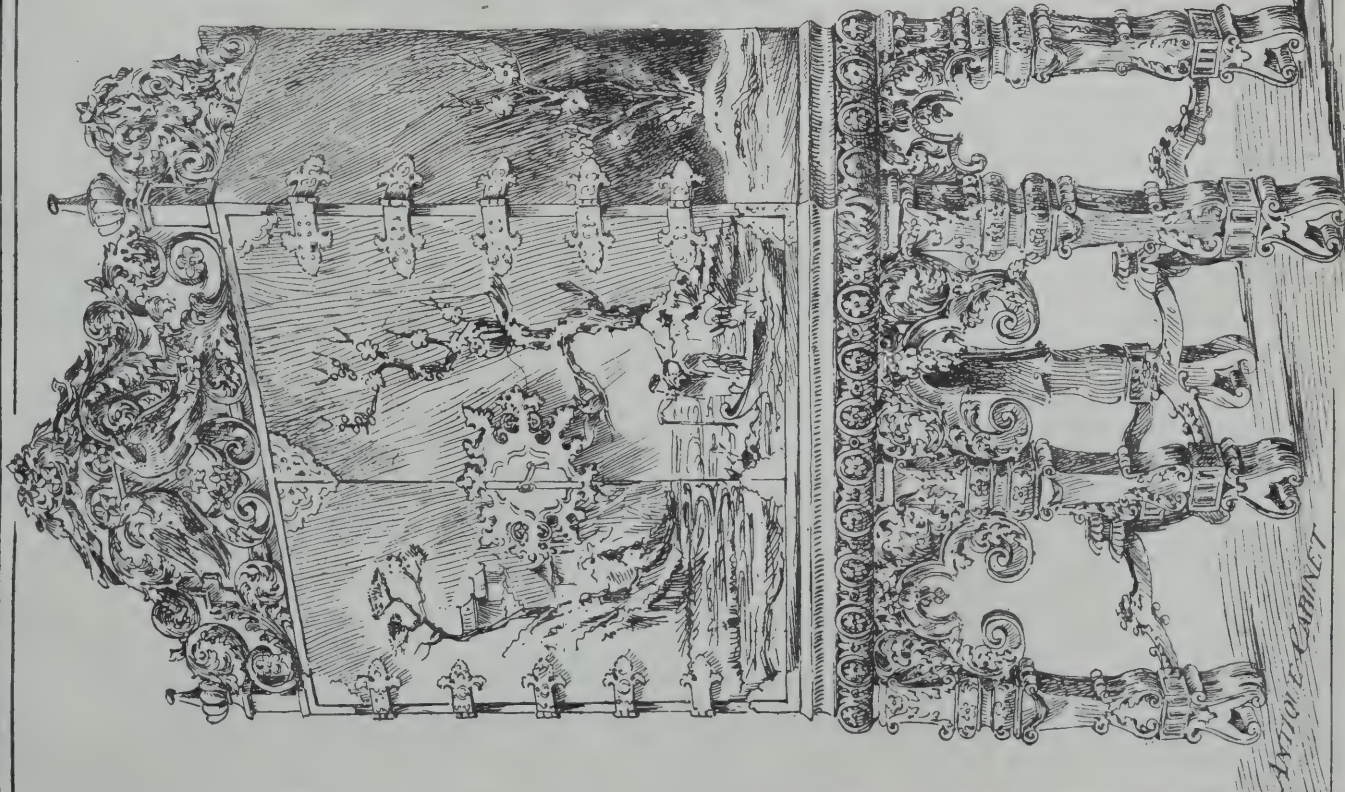
1 · ANNEX · W · HENSMAN · ARCHT



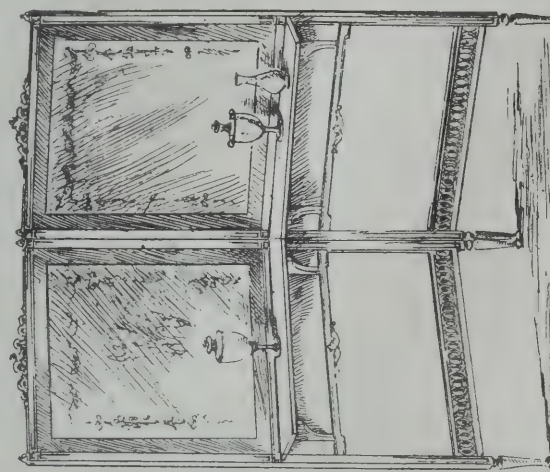




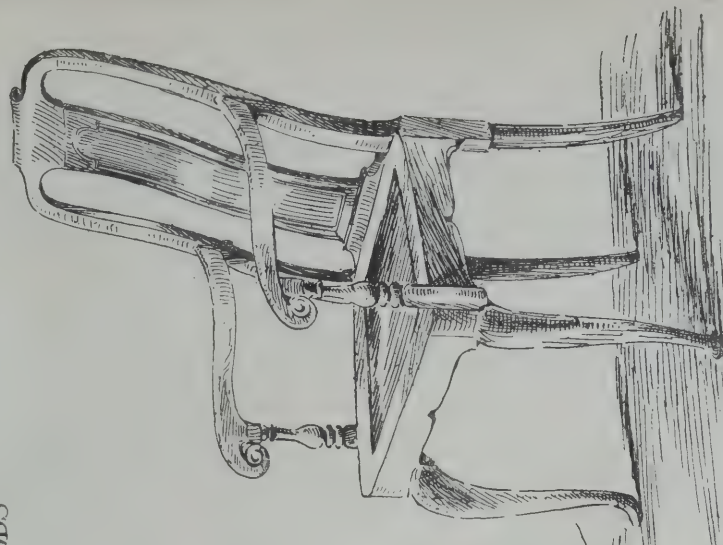
SKETCHES OF DECORATIVE AND ANTIQUE FURNITURE  
AT MESSRS JENKS & WOODS



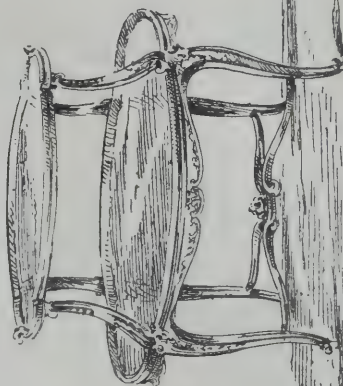
ANTIQUE CABINET



DECORATIVE SCREEN



18<sup>TH</sup> CENTURY ELBOW CHAIR



AFTERNOON TEA TABLE



PIER TABLE

W. F. Young del.



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WOLVERHAMPTON.—CENTRAL HOTEL, PORTSMOUTH.—  
A SALON AND SMOKING-ROOM ANNEXE.—NATIONAL  
BRONZE MEDAL DESIGN FOR A CATHEDRAL.—  
SKETCHES OF DECORATIVE FURNITURE, ETC.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## PORT SUNLIGHT.

THE new works which Messrs. Lever Brothers are erecting at Bebbington, Cheshire, will occupy a site on the Bromborough Pool, opening in the River Mersey, and reaching up to the London and North-Western and Great Western Railways from Chester to Birkenhead. The land purchased measures 52 acres, of which some 24 acres will be devoted to the works, and 28 acres to the erection of dwelling-houses for the workmen, clerks, and managers, with good gardens and recreation ground. The buildings in the works, which are being proceeded with very rapidly, will cover an area of 140,500 square feet, or about  $3\frac{1}{2}$  acres, and will comprise the following departments: Soapery, 228ft. long by 61ft. wide, three stories in height, with floor area of 38,275 square feet; frame room, 228ft. by 153ft., with area of 34,884 square feet; stamping room, 178ft. by 90ft., with an area of 16,050 square feet; card box making room and printing room, 178ft. by 102ft., with an area of 18,190 square feet; wood-box making room, 248ft. by 51ft., with an area of 12,797 square feet; melting-out shed and engine house, 140ft. by 51ft., with an area of 7,210 square feet. Offices, consisting of counting-house, 90ft. by 32ft., and three private offices, laboratory, public space, cloak rooms, and lavatories; also men's and women's dining-rooms, 48ft. by 36ft. each; railway shed, 228ft. by 20ft., with an area of 4,560 square feet; boiler shed, 100ft. by 48ft., with an area of 4,800 square feet. The mechanics' shop, joiners' shop, well room, and electric-lighting engine and dynamo will occupy a building 110ft. by 48ft., with an area of 5,280 square feet. The glycerine shed is a detached building 175ft. by 64ft., with an annexe 45ft. by 17ft., and an area of 11,988 square feet. The whole of the buildings are being carried out, under the direction of Mr. William Owen, A.R.I.B.A., of Warrington, by Messrs. Robert Neill and Sons, of Manchester, whose sub-contractors for ironwork are Messrs. The Pearson and Knowles Coal and Iron Company, Limited, and Mr. Edward Wood; for slating, Messrs. Dean, of Blackburn; and for wood-block flooring, Mr. Roger L. Lowe, of Farnworth, near Bolton. All the buildings are faced with red pressed bricks, from Mr. J. C. Edwards, of Ruabon, and the stone dressings, cornices, and strings are from local quarries. It is anticipated the works will be in full operation early next year, and Messrs. Lever Brothers will gradually transfer the whole of their business from the Warrington Works to this. There are also just about to be erected works entrance lodge, four homes for boys and girls, to accommodate sixty in each, and houses for managers and clerks, and following on these will be a number of workmen's dwellings.

## OLD HOUSES IN THE NEIGHBOURHOOD OF WOLVERHAMPTON.

ABOUT two or three centuries ago, when the forests or woods in the vicinity of Wolverhampton, as Cannock, Brewood, Codsal, Tettenhall, and others, were in existence on an extensive scale, they doubtless proved harbours of refuge for many lawless characters, whose depredations led to the erection of moated farmhouses and residences, many of which are still in existence. Four of them are shown by the accompanying sheet of sketches, No. 1. *The Barnhurst, near Codsal*.—This sketch shows a moated gateway leading to the residence, now a modern one, but which was anciently the seat of the Cresswells, who succeeded the Leveson family. No. 2. *The Dower House, Brewood*.—Was the Dower or jointure house of the widowed ladies of the Giffard family at Chillington, and subsequently from 1753 to 1819 was the residence of the Vicars Apostolic of the Midland district, the last of whom was the Right Rev. Bishop Milner. After Bishop Milner's removal to Wolverhampton the chapel was enlarged by throwing into it the bishop's sitting-room, but it was disused in 1844. This fine old house was unfortunately pulled down about eleven years since, and an ordinary-looking farmhouse erected on the site. The main building was of Elizabethan date, but the lower gabled portion, framed with massive timbers of the famous Chillington oak, was at least a century old. No. 3. *Elston or Ailston, Bushbury*.—According to Huntback, this manor belonged to the Purcells until the time of Edward II., when the heiress married Sir Edward Bishbury. During the reigns of Henry VI., VII., and VIII. it belonged to the Stanleys, who parted with it to the then Bishop of Coventry and Lichfield, who gave it to the Fellows and rector of Lincoln College, Oxford, who are still the owners. The old half-timbered and moated house was inhabited by the occupier of the farm, but was pulled down some eight or ten years back, and a modern farm-cottage built in its place. No. 4. *Pillaton Hall, near Penkridge*.—This was formerly an extensive battlemented and moated house, and for many generations the family seat of the Littletons. It formerly consisted of many noble apartments, the remains of which can still be traced. The gatehouse and chapels are of early 16th century date, the latter being converted into labourers' cottages. The chapel was dedicated to St. Modwena—a noble Irish virgin whose tomb is at Burton. The bed of the moat and the spacious gardens still surround the hall. Inside is a massive oak staircase, each step being a solid block. There are, I believe, but two or three examples of these now left, chiefly in Essex. There is also a good specimen of the ancient stone querne or handmill. About the middle of the 18th century Sir Edward Littleton erected a new mansion at Teddesley, about three miles from Pillaton, which has since remained the family residence.—J. R. VEALL, Wolverhampton.

## THE CENTRAL HOTEL, COMMERCIAL-ROAD, LANDPORT.

THIS building has just been commenced from the designs of Mr. Charles W. Bevis, architect, who was the successful competitor in a competition invited by Mr. W. H. Handley, of Landport, some few months ago. This commercial hotel is conveniently situated, having frontages on two roads. One half of the front portion of building is given up to a large café to be worked in connection with the hotel, and the other half to a manager's room and public bar, having four private compartments adjoining. On the first floor is a large commercial room, coffee-room, and smoking-room, all facing the main road. A billiard-room for three tables is provided at the back of building, and has a bar in connection, and entrance from the hotel on this floor, the public entrance being direct from the main road next the public bar. A business room is conveniently arranged opposite the staircase, and lavatories are placed in connection with all the principal rooms. The second, third, and fourth floors are arranged for bed and sitting-rooms, each floor having a serving room, lavatories, bath rooms, w.c.'s, &c. The front portion of the fifth floor is devoted to the kitchen, scullery, pantries, and other offices, the back portion being arranged as below, for bedrooms. The sixth

floor is similar to the second, third, and fourth floors. There is a seventh floor over back portion of building for servants' bedrooms. The front is constructed of Portland stone, with red granite pilasters up to first floor; and above the stone is from a quarry near Bath, the second, third, and fourth floors having red brick from Rowland's Castle introduced. The front of roof is covered with ornamental copper scales, and the remainder, being flat, is laid with asphalt. Mr. J. H. Corke, of Portsmouth, is the contractor, and the building is to be finished by September, 1889.

## A SALON AND SMOKING-ROOM ANNEXE.

THIS interior forms the salon of a gentlemen's club, designed by Mr. Walter Hensman, with a smoking alcove beyond the arcade to the right of the fireplace seen in the picture, which we publish from the architect's own drawing. In the bay window of this annexe is a raised dais for smokers, which is also extended round one side of the apartment.

## NATIONAL BRONZE MEDAL DESIGN FOR A CATHEDRAL.

THE design which we have illustrated to-day is one for which a National Bronze Medal was awarded to Alonzo P. Wedlake, of Bristol, at the last national competition. The plan of the building is suitable for a rectangular site accessible all round. The style selected—Decorated Gothic—has been carefully studied. When the National Competition prize works were on view last autumn at South Kensington, we noticed the whole series.

## SKETCHES OF DECORATIVE OBJECTS.

WE give a few sketches of decorative furniture made at Mr. James Cawley's, New Inn-yard, E. The carved Chair and Table were made to be presented to Mr. Dixon, the churchwarden of St. Anne's, Limehouse, and have large silver tablets on the back, engraved with the name of the donors. The oak Escritoire was elaborately carved, with panelled ends and back cut from the solid. The other Chairs will explain themselves, and the little, quaint Japanese Bronzes shown are of a better style than those usually sent to this country.

## SKETCHES OF DECORATIVE FURNITURE.

OUR illustration shows a few sketches of decorative furniture at Messrs. Jenks and Wood, 66, Berners-street. The most important was the handsome antique Cabinet of lacquer work with engraved brass mountings, and a carved and gilded pediment of strap work enriched by scrolls and birds supported on a stand of old French character also richly carved and gilt. This was a very fine piece of furniture, and was shown at the opening of the Great Northern Hospital, when it was much admired. The Elbow Chair was a quaint and comfortable one; the lines of the back were good, and it was altogether a nice design and work. The little Screen was one of Messrs. Jenks and Wood's manufacture, as was also the Afternoon Tea-table, both of good design, and well carried out. The Pier Table was richly carved and gilt with cupids and scrolls supported by shaped legs and surmounted by a marble slab with carved moulding round.

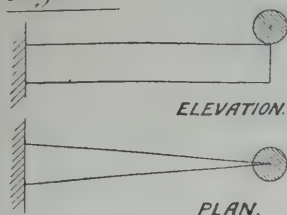
The hall of residence which has been erected at Bangor for the accommodation of the female students attending the classes of the University College of North Wales was recently opened by Lady Penrhyn. It will accommodate about forty students. The architecture adopted is a free adaptation of the Queen Anne style. The walls are of red brick, with Cefn stone dressings. On the ground floor the rooms are laid with Roger Lowe's patent wood blocks, laid by the patentee. Slow-combustion grates have been adopted, and were furnished by Messrs. Barnard, Bishop, and Co. The dining-hall, which forms the centre of the building, is 33ft. long, and in the drawing-room, which is in the west wing, is a Queen Anne oak chimneypiece. The buildings have been let in two contracts, and were executed respectively by Mr. David Williams, Carnarvon, and Mr. Humphrey Williams, Penlon, Bangor; the designs being furnished by Mr. L. Osborne Williams, 70, Victoria-street, Liverpool, and Bangor; Mr. Peter Thomas, Thirlmere-road, Liverpool, being the clerk of the works. The outlay is about £2,700.



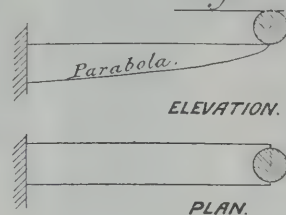
*Correct theoretical forms for rectangular beams to assume.*

*Cantilever with end load.*

*Fig. 38.*

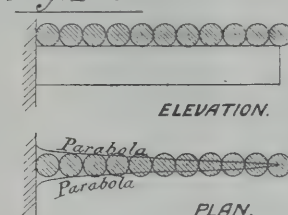


*Fig. 39.*

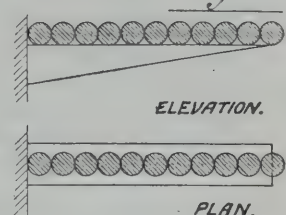


*Cantilever with distributed load.*

*Fig. 40.*

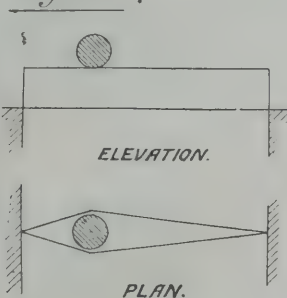


*Fig. 41.*

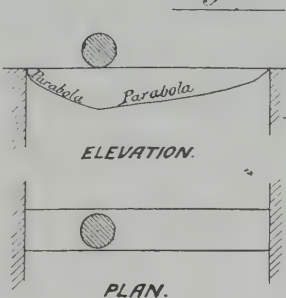


*Beam with single load.*

*Fig. 42.*

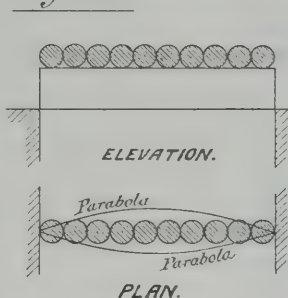


*Fig. 43.*

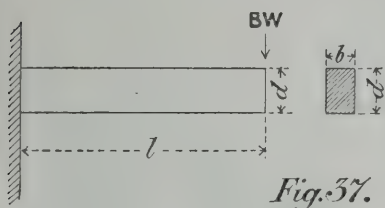
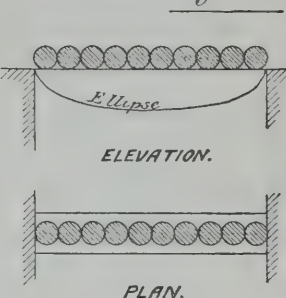


*Beam with distributed load.*

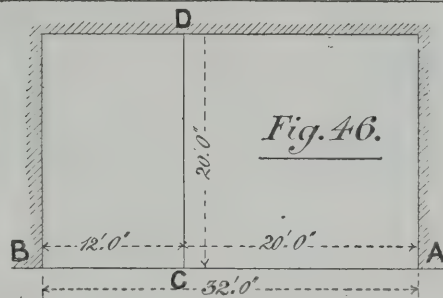
*Fig. 44.*



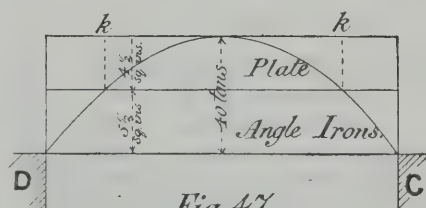
*Fig. 45.*



*Fig. 37.*



*Fig. 46.*



*Fig. 47.*

# STRAINS.—VI.\*

By G. A. T. MIDDLETON.

## RECTANGULAR BEAMS.

THE loads which beams of simple rectangular section are capable of sustaining without failure (generally known as their "B.W.," or "breaking weights"), cannot be ascertained with such mathematical accuracy as can the strains in flanged structures; this being mainly due to the varying strength of different specimens of the same material. Beams of certain small sections and of slight span have been experimented upon, an average struck of the results, and a system of simple proportion adopted to arrive at the strength of other beams of the same material, the results having on experiment proved to be approximately correct. The constant originally adopted was the load under which a beam of 1 in. square section and 1 ft. long would break were it applied at the centre, the constants here given being deduced from this arithmetically.

In the case of a rectangular cantilever bearing an end load (see Fig. 37), of which cantilever,  $b$  equals the breadth,  $d$  the depth, and  $l$  the length, it is fair to assume that—

BW is proportional to the sectional area =  $b d$   
Also that BW is proportional to the leverage =  $\frac{d}{l}$

And that BW is proportional to the material =  $K$ , a constant determined by experiment.

Therefore BW may be taken to equal the product of these three things to which it is proportional, or—

$$BW = b d \times \frac{d}{l} \times K$$

$$= K \frac{b d^2}{l}$$

This equation holds only when  $b$ ,  $d$ , and  $l$  are all taken in inches, BW and K being both taken

according to the same denomination. (As a rule, K is taken in cwt., with the result that BW is also found in cwt.) Some authors take  $l$  in feet instead of  $l$  in inches, and slightly vary the formula, using the value for K originally arrived at as explained above. Students must not become confused between different authorities in this matter, for the result achieved is practically the same in all cases. The reasons why the formulæ given in this work have been chosen are their simplicity, the ease with which they can be remembered, the fact of the same denomination (inches) being used throughout, and of their running on "all-fours" with the strain formulæ given in Chapters III. and IV. The values of K to suit these equations are as follows:

K for Baltic fir	= 13 cwt.
K " English oak	= 15 "
K " Cast iron	= 46 "
K " Wrought iron	= 68 "

It is not necessary in ordinary practice to be acquainted with the values of K for any other material.

The equation given above for a cantilever with an end load varies under different conditions according as the leverage varies, as was shown with the strain formulæ in Chapters III. and IV., and thus:

BW, when distributed along the length

$$\text{of a cantilever} \dots\dots\dots = 2K \frac{b d^2}{l}$$

BW, when situated centrally on a beam

$$= 4K \frac{b d^2}{l}$$

and BW when distributed over the

$$\text{length of a beam} \dots\dots\dots = 8K \frac{b d^2}{l}$$

It must be carefully remembered that the breaking weight, or that under which a structure composed of average material would succumb, is what is ascertained by the above, the "safe load," or that which it would be safe

to allow such a structure to carry, being some proportion of this. It is usual to consider that in timber structures the safe load is  $\frac{BW}{6}$ , and

in metal structures  $\frac{BW}{4}$ .

Efforts have been made to adapt the above formula to other sections than the plain rectangle. In flanged structures, at least, this is unnecessary, for, given the section, the safe strain on either flange, according to the material, is known, and from the strain formula W, then the only unknown quantity and representing the "safe" load, can be ascertained. Under these circumstances, it is not wise to burden the mind with unnecessary formulæ.

Theoretically, the correct forms for beams of rectangular section should be those given in Figs. 38 to 45. Practically, it is generally found to be more economical to make them rectangular in all directions, and of their maximum section uniformly throughout.

## METHOD OF DESIGNING A WROUGHT-IRON GIRDER.

Before proceeding to the consideration of framed structures, it would be well to work out in detail an example of the method to be followed in designing a girder under given conditions. The assumed plan (Fig. 46) will serve this purpose. A girder of 32 ft. span from A to B carries a wall weighing  $1\frac{1}{2}$  tons per foot run, and also helps to support the short girder CD of 20 ft. span, which carries a wall weighing 1 ton per foot run. These loads are assumed to include the weights of the girders themselves.

In a case like this it is necessary to consider the case of the smaller girder first, and to commence by assuming its depth. This is generally taken at anything between  $\frac{1}{2}$  and  $\frac{3}{10}$  of the span, so that a girder 15 in. deep will suffice.



The strain at the centre in either flange may be found by the formula—

$$S = \frac{Wl}{8d} = \frac{20 \text{ tons} \times 20 \text{ ft.}}{8 \times 1\frac{1}{2} \text{ ft.}} = \frac{400 \text{ ft.-tons}}{10 \text{ ft.}} = 40 \text{ tons.}$$

Set this up to scale over the centre of a line representing the girder (Fig. 47), and complete the parabolic outline of the strains at intermediate points, as explained in Chapter IV.

Ordinary wrought iron being capable of safely sustaining a compressional strain of 4 tons per square inch, it is evident that 10 square inches are required in the sectional area of the top flange at the centre to resist a strain of 40 tons. The rivets may be included in this area, as they help to transmit the compression through their shanks.

The angle irons are usually included in the flanges for calculations of area to resist strain. Small L-irons would here be used, say 3 in. by 3 in. by  $\frac{1}{2}$  in., including 2 sq. in. each in section. Thus the two angle irons attached to the top flange contain together 5 sq. in. of metal. The remaining  $\frac{1}{2}$  in. required in the flange can be provided by a 9 in. by  $\frac{1}{2}$  in. plate. The proportion of width to depth thus obtained is fairly good; but theoretically there are no laws to fix this, it being mainly a matter of convenience.

The depth of 40 tons (Fig. 47) should be divided proportionally to the area contained by the L-irons and plate respectively, and right lines drawn through. A plate diagram is thus drawn over the strain diagram, and should at all points include the latter. This could be accomplished by stopping the plate at  $k$ ; but it is hardly worth while to do so on so small a girder, and there would be practical disadvantages in reducing the width of the flanges near the abutments to that covered by the L-irons only.

(To be continued)

## MASONRY AND STONE-CUTTING.

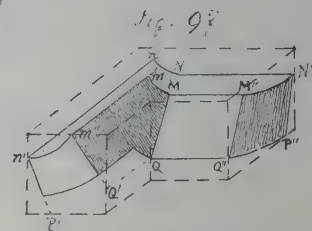
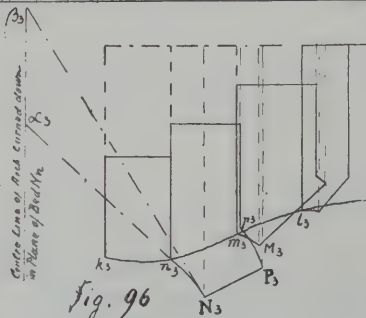
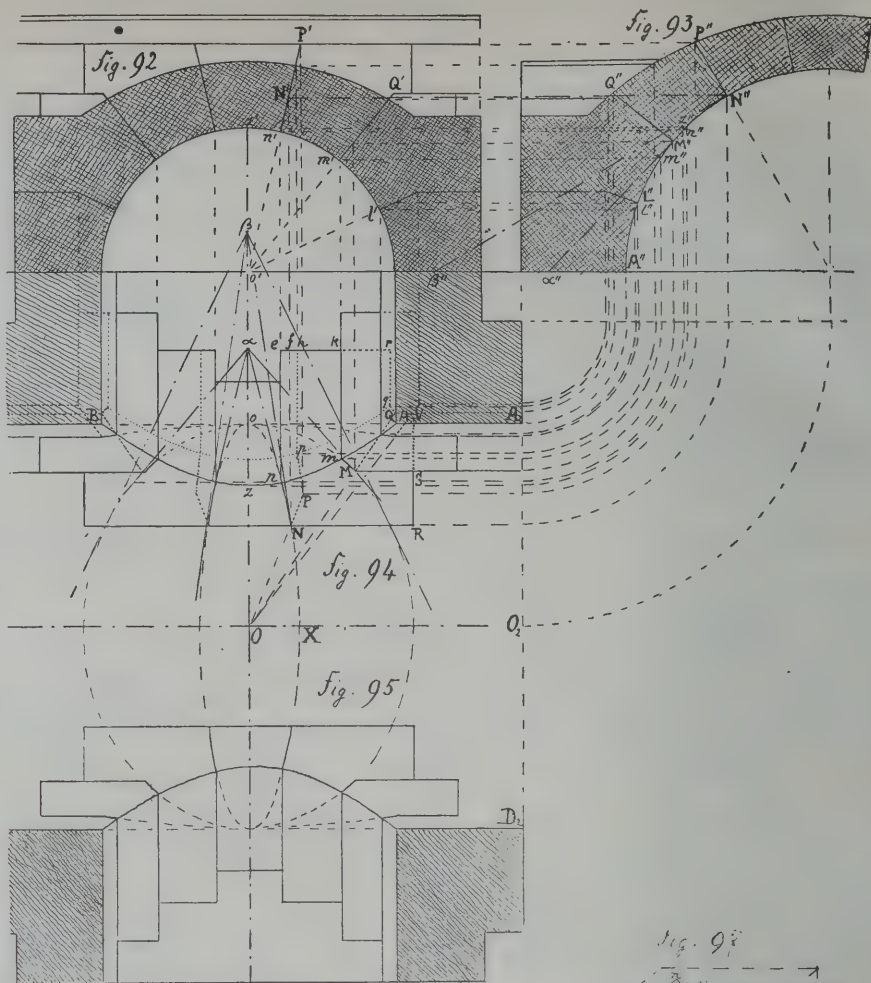
By LAWRENCE HARVEY.

SIXTEENTH LESSON.

**T**HE Welsh Groin or Lunette is formed by the intersection of a barrel vault with another which does not rise to the same level at the crown. Here the groin is a line of double curvature (Fig. 94) projected on plan in the form of the hyperbola  $AzB$ , as we have studied before in the penetration of a concrete vault (Third Lesson). All that we have said, then, relative to drawing the groin line with the help of tangents to the curve, applies again here. As in the former groined vaults, the stones forming the groin belong to both barrel vaults; but the horizontal joint lines of both vaults can no more be at the same level, for this would give variable widths for the stone courses of the larger vault, such as  $l''m''$ ,  $m''n''$ , (Fig. 93). In designing the jointing, we must proceed as follows:

We draw (Figs. 92, 93) the sections of both vaults, springing from the same line, but the section of the larger must be considered as being on the line  $A_2O_2D_2$  at right angles with the centre line of that vault. We begin by drawing the jointing of the larger vault in  $A''L''M''N''$ , and then we divide the smaller vault in such a way that the first joint line  $l'$  be on a lower level than  $L''$ . This is essential for getting a neat looking arrangement of joints, for, when  $l'$  is lower than  $L''$ , it follows that  $m'$  will be lower than  $M''$ ,  $n'$  than  $N''$ , and every bed of the smaller vault will intersect the soffit of the larger vault; whereas, if  $l'$  were higher than  $L''$ , the bed of the larger vault would intersect the soffit of the smaller at that point; but, the joint  $m'$  would probably be lower than  $M''$ , and then the bed of the smaller vault would intersect the soffit of the larger, thus producing an alternative direction in the jointing most unsightly.

Now, from the point ( $n''$ ) where the joint line of the smaller vault reaches the groin, the bed-joint of the smaller vault cuts the soffit of the larger vault along a portion of an ellipse until it reaches the level of the joint  $N$  on the large vault. The point  $N$  is determined by the horizontal plane  $N''N'$  (Figs. 92 and 93), which intersects the plane of the bed-joint of the smaller vault along a horizontal line projected on elevation in point  $N'$ , and on plan on the



line  $fN$ . The same operation would give intermediate points of the curve, but we may observe that the ellipse to which it belongs has the axes  $Oo$  and  $OX$ , by means of which the curves may be trammelled. We can also get the tangents to  $n$  and  $N$ , which will pass through the points  $\alpha$  and  $\beta$ , where the planes  $n''\alpha''$  and  $N''\beta''$  tangent to the larger vault intersect the centre line of the smaller vault. Another useful remark is that if we complete the ellipses formed by the intersections of the larger vault by the other beds of the smaller vault, then the tangent to these curves taken at the same level as  $n$  and  $N$  will all cut the centre line at  $\alpha$  and  $\beta$ , for all these ellipses have the same axis  $Oo$  in common.

After having reached the point  $N$  on the soffit of the vault, the bed-joint of the smaller vault is intersected by the bed-joint  $N''P'$  of the larger vault. The point  $P$  on the extrados is found by a horizontal section such as was used for finding the point  $N$  on the soffit.  $PN$  is the projection of the intersection of the two beds. We should notice that this line prolonged must pass through the point  $O$  where the two centre lines of the vaults meet, for the centre lines  $Oo$  and  $O_2O_2$  are the traces of the planes of all the bed-joints. If the vaults given were not semicircular, then  $PN$  would not pass through  $O$ , where the centre lines meet, but it would pass through the point where the traces of the planes of the bed-joints meet.

From  $P$  the bed-joint of the smaller vault cuts the extrados of the larger vault until it

reaches the point  $p$  on the groin formed by the intersection of the two extrados surfaces; then it cuts the extrados of the smaller vault along the line  $ph$  parallel to the joint line  $no$ . The entire horizontal projection of this joint is, therefore, the figure  $enNPph$ . By a similar operation we find the figure  $kmMQqr$  projection of the bed-joint  $m$  of the smaller vault; and, if we limit the groin stone at the joint  $RS$  on the larger vault, the entire plan of the stone will be the figure  $enNRSVQqre$ .

For working the stone we must get a development of the soffit of the smaller vault, as in Fig. 96, by the same method described in Fig. 16 (Third Lesson). The moulds giving the exact shape of the bed-joints are drawn by rotating all the points thereof round their lower edges, or by simply setting off their points by means of the plan and elevation. To draw the curved outlines  $N_1N_2, p_1p_2$ , the tangents will be found useful; the tangents are found by rotating the centre line, as we have explained in Fig. 16, and drawing the tangents through  $\alpha_2$  and  $\beta_2$ .

To cut the voussoir, we begin by working a prism (Fig. 97), the base of which is equal to the plan of the stone (Fig. 94), and the height of which is equal to the difference of level between the lowest edge of the stone in the smaller vault and its highest edge in the larger vault. The cutting is then carried out by placing the head moulds in their proper positions, then working the soffit of the smaller arch, delineating thereon the groin line  $nm$ .



The soffit of the larger vault is worked by placing the ruler successively on the curves M"N, Mm, mn, nN as guiding lines. The extrados of the small vault is then worked far enough to place thereon the development of the extrados, by means of which the extrados groin line is determined, then the extrados of the larger vault can be worked with proper guiding lines. When great accuracy is not required masons can work the cylindrical surfaces of the extrados by simply sighting their straight-edge with the edges of the beds, and keeping its direction about parallel to the same. Lastly, the back of the stone is most often not worked at all, the operation planes being simply left.

If the difference of level between the two vaults at the crown is small, then it will be better to place the joint lines in both vaults at the same level, for in that case the difference of widths A"l", l"m", m"n" of the several courses will be imperceptible. If the springing line of the smaller vault be raised so that the crown of the smaller vault be placed on the level of the crown of the larger vault, then we shall have the ancient Roman groin, which we can thus construct in hewn stone instead of concrete.

#### THE CINQUE PORTS.\*

THE volume of the series of "Historic Towns," edited by Professor E. A. Freeman, D.C.L., and the Rev. William Hunt, M.A., just published by Messrs. Longmans, Green, and Co., is a sketch of the history of the Cinque Ports, by Captain Montague Burrows, of the Royal Navy, and Chichele professor of modern history in the University of Oxford. The author has had to find his materials out of numerous records and charters, and is indebted to the labours of the Historical Commissioners, the writers of the Roll Series, and various learned societies. When the Cinque Ports were in their prime they numbered five ports—Hastings, Sandwich, Dover, Romney, and Hythe; Winchelsea and Rye were added after the Conquest. This confederation of ports was charged with the important mission of controlling the food supply of the people, the herring fishery, with the defence of the English shores, and the consolidation of the Royal Navy. Captain Burrows first speaks of the physical changes that these ports have suffered from the action of winds and tides, producing those remarkable appearances on the coasts which are known to have been the result of the "Law of Eastward Drift." The coasts of the British Isles in a direction from north-west to south-east show the effects of this constant action of the sea and wind. The Dorsetshire and Sussex coasts, and that of Kent, exhibit remarkable accumulations of shingle and sand, which are swept up from the bed of the Channel over the projecting edges of the coast. The agencies which produce this result are the flood-tide and the prevalence of the south-west wind, combined with the action of the tidal wave. These forces have during ages wrought changes in the coast, also the formation of shingle and sand shoals, which are particularly to be seen at the Goodwin Sands and south-east part of the coast. Captain Burrows writes: "The operation of the Law of Eastward Drift must be traced first at Hastings and its immediate neighbourhood; secondly, at Winchelsea, Rye, Romney, and Lydd, grouped as they are under the system of Romney Marsh, with which may be taken Hythe, Folkestone, Dover, Walmer, and Deal; and, lastly, at Sandwich, and the towns affected by the river system of the estuary, which once divided the Isle of Thanet from the rest of Kent. Not one of them has escaped. All have been separated from the element to which they owed their existence, and if not deserted by the routes of commerce quite so completely as the dead cities of the Zuyder Zee, some of them have fared worse. Even Dover offers no real exception to the operation of the law, for it has only held its own by the aid of a vast expenditure of the national funds." At Hastings, the eastward drift has swept away the cliffs and filled up the hollows. Hythe has yielded still more to the eastward drift of shingle, while Sandwich bay has become one desert of sand,

which cuts it off from the sea for a distance of two miles. Captain Burrows's narrative of these changes are interesting. After sketching the early history of the Ports, and their Teutonic origin, their organisation in the Norman Conqueror's time, during which era they were in a flourishing state, their condition under the Norman and Angevin Kings the author in the next chapter shows the important position they occupied in the development of the Royal Navy. The Ports had to provide 57 ships, each of which was to carry 21 men and a boy, though the strength of the fleet no doubt was augmented. In the 14th century the Ports enlarged their ships, and of these interesting particulars are given. The expense of maintaining the fleet was shared, of course, by the "members" of the head Ports. During John's reign the Cinque Ports took an active part in the defence of the country against France; Henry III. thanked the Barons for their "frequent and excellent services both to the king and his ancestors." At this period the Ports appear to have bestowed signal services in supplying ships for conveyance of troops and royal personages. Winchelsea early achieved a distinction, and shared with Dover many of the honours of the time; but owing to its isolated position, and the constant inundations from which it suffered from the sea breaking in, it was seriously impaired. In 1254 the sea destroyed a great portion of it, and afterwards Edward stormed its walls; but it was reserved for the tempest of 1287 to finally sweep the town away, so that its site could not be pointed to. The decline of the Cinque Ports began in Edward III.'s reign, or at its close, owing partly to the natural decay of the harbours, and partly to the altered circumstances of the age. A development of the navy was called for beyond that which the Ports were able to provide. Southampton and other ports were called into requisition; the Cinque Port harbours were incapable of providing for the larger build of ships. These influences, and the destruction of many of them by the sea and wind, hastened the decline, which culminated in the 16th century. The author's account is brought to a close by an interesting chapter dealing with the modern history of the Cinque Ports and the two ancient towns, also a sketch of the "members" of the Ports, which include Seaford, Pevensey, Fordwich, Deal, Folkestone, Faversham, Lydd, Tenterden, and other non-corporate towns. Capt. Burrows's book is an instructive one, as throwing light on a branch of English history, and in recording the development and decline of places about which little is known historically.

#### CHIPS.

The congregation worshipping at the Catholic Apostolic Church, in Upper Berkeley-place, Clifton, Bristol, are to have a new habitation in University College-road, on which it is proposed to erect a new church at a cost of £3,500. Plans have been prepared by Mr. H. Whiteman Rising, of London, and the contract has been let to Messrs. James Wilkins and Son, of Ashley-road. The building will comprise nave and side aisles, upper choir, sacristy, three vestries, organ chamber, &c. It will be of Clifton stone, with Bath stone dressings, and the roof will be covered with permanent green slate.

Twelve windows, in the clerestory of All Saints' Church, South Acton, have been filled with stained glass, the whole representing an angelic choir. The work has been done by Messrs. Powell Bros., of Leeds.

An additional water-supply for Jedburgh has just been provided at a cost of £2,400, under the direction of Mr. Charter, the borough surveyor. The supply is derived from springs at Shawburn, five miles from the town, and supplements the waterworks constructed twenty years since, which are now inadequate to the requirements.

The foundation-stone of a new mission church at Hunslet Carr, Leeds, was laid last week. The site of the building, which will be entirely of red brick, is the corner of Balm-road and Moor-road. The design is Early English, and provides for a nave of 60ft. by 30ft., which will accommodate 400 people; three class-rooms, divided from the nave by revolving shutters, and another class-room. Mr. J. E. Leak is the architect, and the work is being carried out by Mr. Ed. Oakes, builder.

The new City of London Court for Small Debts, built for the Corporation, will be opened by the Lord Mayor (Alderman Whitehead) on Dec. 6th.

#### COMPETITIONS.

PORTSMOUTH NEW TOWN HALL.—In a limited competition for designs for filling the tympanum of the portico with sculpture, the design of Mr. H. T. Margetson, of Chelsea, at a cost of £1,380, has been accepted by the corporation.

SUNDERLAND.—The design submitted by Mr. Hy. T. Gradon, A.R.I.B.A. (of the firm of Messrs. Alexander and Gradon, architects, Middlesbrough), in open competition for the new Church of St. Hilda, Millfield, Sunderland, has been selected by the committee out of twenty-three submitted in the competition. Mr. Ewan Christian, architect to the Ecclesiastical Commissioners, acted as adjudicator. The church is designed to accommodate over 500, and will cost about £3,000.

#### CHIPS.

One of the most imposing buildings recently erected in Leeds is the one just now finished, belonging to, and built for, Messrs. J. W. Petty and Sons, the well-known printers, and styled "The Whitehall Printeries," being situated in Whitehall-road, Leeds, and facing all the railway lines running into Leeds, in the centre of which is placed a large illuminated clock, with a 6ft. 6in. external dial, and another large dial showing inside the works. The clock was made by Messrs. Wm. Potts and Sons, of Guildford-street, Leeds, who are well known for this kind of work, and is a first-class clock, having Lord Grimthorpe's double three-legged gravity escapement inserted, and compensation pendulum composed of iron and zinc tubes, with heavy bob cylindrical in form. The clock is constructed on the solid horizontal cast-iron bed-frame, planed perfectly flat; all the bushes of gunmetal screwed into the frame, iron barrel, gunmetal wheels and steel pinions, all cut and polished on the engine, steel cord and block pulleys bushed with brass and pivoted in, dial or motion wheels of gunmetal, cut and polished on the engine, maintaining power on the bolt and shutter principle for keeping the clock going during the time of winding up, copper hands balanced or counterpoised within, also index dial for the purpose of setting and adjusting the outside hands. The outside dial is of skeleton cast-iron frame, glazed with white opal glass for illumination; the inside dial is solid, with gilt figures and minutes and hands, and a dark background. We may say that the above clock will prove itself one of the most useful additions to the town. Being close to all the railway lines, the time can be seen by everyone wishing to know the correct time, and Messrs. Petty deserve the best thanks of the public for this useful addition.

The church, St. Mary, Bishophill Junior, York, is warmed and ventilated by means of Shorland's patent Manchester stove, supplied by Mr. E. H. Shorland, of Manchester and London; Mr. Moore, of Hampstead, being the architect.

On Saturday last the Mayor of Bradford laid the memorial stone of Gospel Union Hall. The building will have an open timber roof, with a gallery at one end; the front elevation will be of pitch-faced stones, with ashlar dressings. The work will be carried out from plans drawn and superintended by Mr. William Rycroft, architect, of Bradford. The total cost, including land, is estimated at about £900.

Austerland's Store, Oldham, was opened on Saturday last. The contract for the erection of the building was let to Messrs. J. and J. Whitehead, Oldham. The plans have been prepared, and the work carried out, under the supervision of Mr. A. Banks, architect, Oldham.

Those of our readers who were interested in the visit of the Colonial Bishops to England this year will be pleased to learn that a handsome silver pastoral staff is to be presented to the Bishop of Qu'Appelle, Canada. The work has been entrusted to Jones and Willis, of Birmingham and London.

Lady Shelley started on Wednesday an engine which drove in a pile in connection with a new pier to be erected at Boscombe, a mile and a half to the eastward of the present Bournemouth pier. The pier, the first portion of which is to be 400ft. long, is to be completed before the next summer season. It will cost £6,000.

Mr. Irving laid on Wednesday the foundation stone of the new theatre at Bolton, now being built from designs by Mr. Frank Matcham.

At the annual meeting of the Glasgow Institute of Architects, held on Tuesday night, Mr. John Gordon, of 134, Bath-street, Glasgow, was elected president in succession to Mr. David Thomson, and Mr. William Leiper was elected to the vice-presidency.

\* Historic Towns: Cinque Ports. By MONTAGUE BURROWS, Captain R.N., &c. London: Longmans, Green, and Co.



## Building Intelligence.

**CRIPPLEGATE, E.C.**—The reopening of the chancel of St. Giles's Church, Cripplegate, took place on Thursday, the 12th inst. The works, in forming a clearly defined choir to the chancel of the church, necessitated the following alterations: The setting back of the pulpit, the removal of two seats each side of the nave, and extending the tessellated paving in front of the new choir screen. The floor of new choir has been raised, and is approached by two marble steps, and inclosed by a hammered iron dwarf screen on a Portland stone moulded plinth; the floor of the choir is executed in marble mosaic in diamonds, with fleur-de-lys centres. The decayed floor at the eastern end of the aisles has been removed, and solid wood-block floor on concrete substituted. The new altar-piece and super-altar are executed in panelled wainscot, having solid ebony columns. The new clergy desks and choir stalls are in wainscot, and are placed upon a wood block floor. The whole of the works have been designed and carried out under the superintendence of Mr. F. Hammond, of Circus-place, E.C., and executed by Messrs. Dove Bros. and Jones and Willis, at a cost of about £470.

**JESMOND.**—St. George's Church, Jesmond, Newcastle-on-Tyne, was consecrated on Tuesday. It is Italian in style, and has a campanile 180ft. in height; sittings are provided for 850 people. The altar and reredos are made of Pavonazza marble, and were illustrated in the BUILDING NEWS of August 26, 1887; Messrs. Emley and Sons, of Newcastle, executed the work. The dado is formed of dark English marble, surmounted with specially designed emblematical tiles. Above the reredos there is some stone carving, and figures in mosaic, in emblematic patterns. The choir seats and screens are of carved oak. On the right of the chancel is the clergyman's vestry, choir vestry, and organ chamber, while on the left is a morning chapel. The pulpit is of carved oak, on an alabaster base supported by rouge jaspar marble pillars. All the pews are of oak, and the flooring of the aisles is of marble mosaic. The windows in the north aisle are plain; those in the south are filled with stained glass, executed by the Gateshead Stained Glass Company. At the west end of the church is a window representing the Resurrection. The bowl of the font is cut out of a solid block of onyx, and is supported by rouge jaspar marble columns on an alabaster base. A wrought-iron cover is suspended from the roof. To the east of the church is St. George's Parochial Hall, which holds 400 people. The architect is Mr. T. R. Spence, formerly of Newcastle, but now of London, and Mr. John Dodds was the clerk of the works.

**KIRKBY MALLORY.**—The parish church of All Saints, Kirkby Mallory, near Hinckley, was reopened on the 11th inst. after extensive repairs and additions. It was erected in the 13th century, and consists of nave, tower, and chancel. The plaster ceilings, put in at the end of the 17th century, having become decayed and dangerous, had to be taken down, when the old roof principals and timbers were exposed. These have been restored and made good. In building a new organ chamber and vestry, the arches and piers of an old chancel aisle were discovered built up in the wall. These have been opened, and form the communication between the organ chamber and chancel. The works have been carried out by Messrs. T. and H. Herbert, of Leicester, from the designs, and under the superintendence, of Messrs. Osborn and Reading, architects, of Birmingham.

**LONDON SCHOOL BOARD.**—At the meeting of this Board held on Thursday in last week, a report was presented from the Special Committee on the Works Department respecting the alleged defects in the erection of three schools in North London. Mr. Ewan Christian had been engaged in making detailed examinations of the three schools, and reported defects in the buildings, some of the work being "unworkmanlike," some of the material not according to specification, and, in regard to foundations, the depth, where examined, had been less than shown upon the drawings. Mr. Christian added that if the Board desired to know exactly wherein the foundations differed

from what was shown on the contract drawings, it could be ascertained, but the examination would involve an extent of excavation and a disturbance of surface and general school-work and organisation such as, in his judgment, would be quite unjustifiable. In two of the schools variations had occurred; but, inasmuch as no evil results were traceable to them, he was not of opinion that it was worth while to investigate further. It would not be productive of any result commensurate with the inevitably heavy expenses incurred in the operation. He thought it probable that even Mr. Rickman would, under present circumstances, have considerable difficulty in arriving at an accurate opinion respecting the accounts. The board did not carry the subject further.

**MORNINGSIDE.**—The enlargement of Morningside parish church, Edinburgh, having been completed, the building was reopened on Sunday. The apse at the east end has been taken down, and a square chancel, 25ft. by 16ft., providing for the Communion table, elders, and choir, has been built out to the boundary wall, with organ-chamber adjoining it on the south side. The large organ and choir has been removed from the west gallery, and 95 additional sittings provided. In the central area the pews are arranged on each side of a wider centre passage, with side passages next the wall, and the floor, passages, and heating apparatus have been renewed. The finishings of the chancel are designed in the Norman style to harmonise with the details of pulpit and Communion table; and a reredos has been erected. The alterations have been executed from plans prepared by Messrs. Hardy and Wright, architects, Edinburgh.

**SAUNDERTON CHURCH, NEAR PRINCE'S RISEBOROUGH.**—The Church of St. Mary, founded early in the 13th century, was reopened on the 5th inst. after restoration. The work was commenced early in this year, and consists of an almost entire rebuilding. New open-timbered roofs of pitch pine, covered partly with the old tiles, have been put on nave and chancel; a new vestry is built on north side, and an oak-timbered porch on south side. There is an interesting oak-timber belfry containing three bells at the west end, the posts and framing of which are carried down to the floor inside. This has been thoroughly repaired and recased outside with oak, filled in with plaster panels, and a new spire roof, covered with oak shingles, is added, in place of the former lead flat top. A new east window of three lights has been inserted and filled with stained glass. The ancient ornamental floor tiles have been preserved and relaid in chancel and vestry. The font is a curious example of a Norman base and bowl, pieced out at top with a carved rim, about 6in. deep, of Early English date. Great care has been taken to re-use all the old stone-work of doorways, windows, &c., and to preserve all old features of interest. The architect under whose personal superintendence the work has been carried out is Mr. J. S. Alder, of Palmerston-buildings, Old Broad-street, London, E.C., and the builder is Mr. John Wheeler, of Wantage.

**ST. ALBAN'S.**—The new hospital and dispensary in the Verulam-road was opened on Wednesday week. The building, which provides ward accommodation at present for 12 patients, has been designed with a view to future enlargement. The wards, which face the south and are on the ground story, consist at present of a male ward for six beds, an accident ward for two beds, and a female ward for four beds. The height of the wards is 12ft., and the cubic space allotted to each bed is rather more than 1,300ft. Separate lavatories, slop sinks, and water-closets are provided for males and females, separated from the wards by a corridor. Provision is also made for a nurse's room between the wards, a bathroom, and an operating-room. A kitchen with separate external entrance, a scullery and a serving lobby are placed in the centre of the building, and a larder and a storeroom in a small basement story. A staircase off the main entrance-hall leads to a set of rooms on an upper story, consisting of rooms for the matron, a servant's room, linenry, and a room for convalescents. In connection with the hospital proper is a dispensary for out-patients, with a separate external entrance. The walls, which

are constructed with local bricks, are built with a hollow space. The roofs are covered with Ruabon tiles. The ward and corridor floors are of pitch pine, and the internal joinery is of the same material, varnished. The architect was Mr. Alexander Graham, F.S.A., Carlton-chambers, Regent-street, London, and Mr. Alderman Miskin has erected the hospital under the supervision of Mr. Ford, the city surveyor.

### CHIPS.

A new vicarage and mission room erected in connection with St. Andrew's Church, Whitmore Reans, Wolverhampton, were dedicated on Monday week by the Bishop of Shrewsbury (the Right Rev. Sir Lovelace Stamer). The vicarage has been built with a frontage to New Hampton-road, and a mission room to accommodate 150 people at the rear. The work was executed by Mr. Bradney from the designs of Mr. Beck, both of Wolverhampton, the cost being £1,847.

The Victoria Hospital at Swindon was opened last week. It has cost about £1,550, and was built from plans by Mr. W. H. Read, M.S.A., of Swindon, selected in competition. Mr. W. Chambers was the contractor for masonry, and Mr. T. Barrett for joinery.

The Free Public Library in Royal Avenue, Belfast, erected at a cost of £20,000, was opened on Saturday by the Lord Lieutenant; his predecessor, Earl Spencer, laid the foundation stone four years since. In connection with the library are a news room and art gallery. Messrs. H. and J. Martin were the contractors for the building.

An International Exhibition of Ironmongery and Art Work in Metals will be held at the Agricultural Hall, Islington, from November 12th till the 24th inclusive.

The Town Council of Leeds have unanimously resolved to purchase, if possible, Kirkstall Abbey, at a cost not exceeding £6,000, the negotiations for the acquirement of the ruins for the town by a syndicate having fallen through.

A drinking fountain has just been erected in Stanley Park, near Stroud, for Sir William Marling, by Messrs. R. L. Boulton and Co., of Cheltenham and London, from designs by Mr. J. P. Moore, of Gloucester.

The tender of Messrs. W. Cowlin and Son, of Bristol, has been accepted for the completion of the additions to Cleeve Church, near Yatton. The architect is Mr. C. H. Simson, F.R.I.B.A., of Taunton.

The memorial in Titchfield Church to the late vicar, executed by Mr. Alexander Fisher, of South Kensington, was finished last week. The memorial is in the form of a large panel on the west wall, 18ft. by 15ft. The subject represents the miraculous draught of fishes. Our Saviour is the centre figure, and St. James, St. John, St. Peter, St. Thomas, St. Nathaniel, and some of the other Apostles are shown in the boats. The treatment of the subject is in sympathy with the old Italian masters of the Renaissance.

Lord Aberdare will unveil on Monday next the statue of the late Sir Hugh Owen, which was offered to the Corporation of Carnarvon conditionally upon their providing a pedestal and site, the cost of the statue being defrayed by London subscribers. These conditions have been complied with, and the statue has been erected in Castle-square.

On Saturday the new post-office and premises at Longton, built by Messrs. H. and R. Inskip, of that town, were occupied. The new premises consist of a public office, sorting room and postmen's room, with a dwelling-house for the postmaster. Mr. J. Taylor was the architect.

The five empty niches in the series of thirteen that occur immediately over the altar in the high altar screen in St. Alban's Abbey have just been filled with statues of pure white alabaster, so that the group of Christ in majesty, surrounded by His Twelve Apostles, is now complete. The new statues comprise the central statue of Our Lord in majesty, which, like the niche itself, is slightly larger than the others, and representations of SS. Jude, Philip, Simon, and Matthias. Sixty-three of the vacant niches in the screen have now been filled, and the remaining thirteen are in course of execution, the sculptor being Mr. Harry Hems, of Exeter.

It is stated in positive terms that Mr. G. F. Watts, R.A., has in the most absolute way willed to the nation thirty-seven of the works he considers amongst the strongest he has painted.

A drinking fountain in Queen's Park, Kilburn, built at the cost of Mr. Aird, M.P., was inaugurated on Thursday. It is of cast-iron, standing on a Parbeck stone base, and was made by Messrs. George Smith and Co., of Glasgow.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 33, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

## TERMS OF SUBSCRIPTION.

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## ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of eight words, the first line counting as two, the minimum charge being 6s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 6s.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

## NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII, XLVI, XLIX, L, LI, LIII, LIV, may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—W. and Co.—E. S. and Co.—J. B. L.—S. L. B.—J. K.—H. H. and Co.

J. HANCOCK. (Very poor stuff at the price; nothing beats the old material.)—A. F. (Jeffrey and Co., 64, Essex-road. We have heard or seen nothing of the other firm for a long time. We suppose they are still in existence; but if firms neglect to keep themselves before the public they are soon forgotten.)—A. J. (So it was said at the time; but you know how many monthly nurses it takes to help a mouse into the world at Conduit-street.)—N. S. AND Co. (A little too general for our columns.)—ONE WHO WAS HAD. (It looks very like a swindle, we fear; but the so-called architect seems to have kept on the right side of the hedge so far as criminal proceedings are concerned.)—PERCIVAL. (The first—Goodness knows who the other people really are just now.)

## Intercommunication.

## QUESTIONS.

[9788].—**Gauging Streams.**—Will some readers give the rule in figures for measuring the water passing per minute through a notched board 3½ in. deep in each case, one notch 18 in. wide, and one 6 in. wide? Stream has a fall 1 in 500.—WATER WHEEL.

[9789].—**Foundations and Excavations.**—I notice that Mr. Lovegrove, in his articles on Estimating, takes the same lineal dimensions for excavation and concrete in foundations as the footings and brickwork above. I can see that this is right as applied to external walls, but not as applied to internal cross walls. Suppose a cross wall running between two main walls 20 ft. apart, and that the concrete footings project 13½ in. from internal face of main walls, the lineal dimension of excavation and concrete for cross walls, if on same level, would seem to be 20 ft., 2 ft. 3 in., 17 ft. 9 in. I notice that Leaning, in his "Quantities," p. 298, treats these dimensions in the same way as Mr. Lovegrove. I should therefore like to know whether it is usual to take the footings, concrete, and excavations in cross walls "fat," and whether this would be considered right in an examination?—STUDENT.

[9790].—**The Freedom of the Joiners' Company.**—Would any kind reader tell me what advantage it would be to a working joiner to be made a freeman of the "Joiners' Company," as he has had the "honour" offered him, but considers the "fee" (twelve guineas) very high.—A WORKING JOINER.

[Very wisely I—ED.]

[9791].—**Dated Examples of Half-Timbered Houses.**—I shall feel obliged if any of your readers can

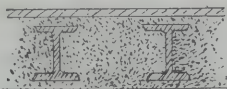
give me examples of dated half-timber houses or carved woodwork used constructionally—i.e., as angle-posts, beams, or barge-boards?—PARTICULAR PETER.

[9792].—**Quantity Surveying.**—Can any reader let me know whether there are any examinations in quantity surveying only that I can go in for?—STREONA.

[9793].—**Valuer's License.**—Need a valuer of land and buildings or an architect and surveyor who values work to have a license? If so, what is the annual cost of same?—PUPIL.

[9794].—**Inclosure for Hot-Water Coil.**—Should be glad to have practical suggestions as to what material to use for an inclosure for hot-water coil in first-class drawing-room. Enamelled iron panelling is objected to, as the design of such is commonplace, and unsuitable for position. White marble is suggested, but it is feared this will discolour from heat. Opinion invited on this point.—DESIGNER.

[9795].—**Wrought-Iron Joists.**—Will some reader kindly give rule for calculating strength and distance



apart of wrought-iron joists, embedded as sketch, in concrete floors? Also thickness and composition of concrete.—NEMO.

[9796].—**Paint on Cement.**—During the winter I did some cement plastering on brickwork, and soon afterwards painted the same. The paint has never thoroughly set, and is sticky. Shall be glad to know the cause of it, and what is the best to be done with it.—LANCASHIRE LAD.

## REPLIES.

[9776].—**Fir-Framed Factory Floor.**—"Dilemma" can render the floor watertight by covering it with a ½ in. layer of good asphalt. A cheaper way is to cover it with impervious roofing canvas.—STREONA.

[9779].—**Eaves.**—The fact that you have tacitly allowed your neighbour's eaves to project over your property does not deprive of the right which everyone enjoys to everything between the sky and his land. Ask your neighbour, as a matter of courtesy, to allow you to remove his overhanging eaves, and if he objects excise them yourself.—K.

[9788].—**Graphic Statics.**—Yes, without hesitation get Professor Henry Adams's treatise on "Strains," 5s., published by Spon. It is eminently simple, and carries the student on by easy stages or chapters, at the end of each of which are given exercises by way of tests as to progress, with answers to same. No mathematics beyond the merest rudiments of algebra are introduced—in fact, the graphic method can be followed right through if preferred. The illustrations are all arranged on extending plates at end of book, one plate confined to each chapter.—CHARLES L. FIELDER.

St. Alphege Church, Canterbury, after being partially rebuilt and restored, was reopened on Monday week by the Archbishop of Canterbury. The church dates back to about the 12th century, and has for some years past been in a ruinous condition. The work of restoration has been carried out by Mr. H. B. Wilson, under the direction of Mr. R. Herbert Carpenter. The alterations included the pulling down of the tower, which was unsafe, and the addition of a vestry. The Communion table has been presented to the church by a parishioner of St. Andrew's, who gave the table to that church, which has since been closed. An oak lectern has been presented by Canon Blore, and Mr. Wilson has given two antique choir stalls. Mr. F. H. Brown repaired and placed the organ of All Saints' Church in the newly-opened edifice.

At the Michaelmas Quarter Sessions for the West Riding of Yorkshire, held on Monday, the Marquis of Ripon, chairman, reported that the new asylum at Menstone was now open, having been built at a total cost, including site and railway, of £236,892. He moved, in accordance with the unanimous wish of the town asylums committee, that a second grant of £1,000 be voted to the building surveyor, Mr. Joseph Vickers Edwards, in consideration of the important services rendered by him as architect of the asylum. Lord Ripon added that when Wardsley Asylum was built, Mr. Edwards's predecessor was paid 2½ per cent. on the cost, whereas the total extra allowance for the erection of that at Menstone would be the £2,000 now proposed to be completed by the voting of the second moiety. The resolution was adopted.

An inquest on the body of Mr. Montefiore Lupton, of Leeds, was held at Waterford on Tuesday. Mr. Harry Lupton identified the deceased as his brother, who, he said, was an architect. He was of a desponding disposition, and had travelled in New Zealand and elsewhere for the sake of his health. Mr. Samuel Sutcliffe, the deceased's travelling companion, said he arrived at Waterford with him on August 30th. He missed the deceased from a steamboat about to proceed to Cork. The deceased's body was found a long time afterwards in Kilbarry Bay. The jury returned an open verdict.

## LEGAL INTELLIGENCE.

**PROCEDURE IN CASES OF ANCIENT LIGHTS.**—**LEE V. HANCOCK.**—In the Lord Mayor's Court, on Thursday, the case of "Lee v. Hancock" was heard by the Recorder (Sir T. Chambers, Q.C.) and a jury. The plaintiff, Miss Emily Lee, sued as the occupier of 38, Warwick-lane, E.C., to recover damages for interference with ancient lights and air, for trespass, and for so negligently rebuilding a party wall as to cause damage and inconvenience to business, the defendant having premises next door to the plaintiff. Mr. Denniss, counsel for the defendant, argued that, under the Metropolitan Building Act, 1855, a Court of Common Law had no jurisdiction to inquire into the matter of the party wall. The statute said that that must be settled by arbitration. The only matter which could be decided here was the question of ancient lights and air. The Recorder, after hearing Mr. Candy, Q.C., for the plaintiff, decided that the contention of Mr. Denniss was right, and that he had no power to try the question of damage arising through the party wall. It was eventually agreed by counsel that, rather than try the case twice, the whole matter should be referred to an arbitrator to be agreed upon. A formal verdict for the plaintiff for £300, the amount claimed, was then entered. Another action, "Slaughter v. Hancock," arising under similar circumstances, was disposed of in the same manner.

**SOUTH SHIELDS BUILDERS FINED.**—At the South Shields Police-court on Friday three adjourned summonses for offences against the building by-laws of the corporation came up for decision. The first case was that of Robert James Mitchellson, who had been convicted of erecting a building in Ocean-road contrary to the by-laws, and was now sued for a continuing penalty for having allowed it to remain for 125 days after the conviction. The chairman said the continuing penalties would amount to a very large sum, and the bench were not disposed to enforce them in a severe fashion; nor were they disposed to give merely nominal penalties. A penalty of £35 and costs would be imposed.—Joseph Knight, builder, was summoned for a continuing penalty in respect of a building in Erskine-road, built contrary to the plan submitted to, and approved of by, the corporation. Mr. Thurgood, for the defence, said defendant had altered the building since the case was brought into court so as to bring it within the by-laws. The bench considered this case worse than the previous one. They thought it necessary in this case to inflict a penalty of 4s. per day, which amounted to £52 8s. A case would be granted, Charles Renoldson, of South View-terrace, was summoned for a continuing penalty in respect of a conservatory in connection with his residence, and was fined £25 5s. 9d., being at the rate of 4s. 3d. per day.

## CHIPS.

The first of a course of lectures on "Architectural Construction" was delivered at University College, Liverpool, on Tuesday week by Mr. J. Battye, the clerk of works at that institution.

The city council of Liverpool have applied for a faculty to enable them to lay out St. John's Churchyard as a place of public walks, in accordance with plans prepared by the city surveyor, and estimated to cost £4,000 in execution.

A new pulpit of carved oak, standing on a stone base, and new altar rails were last week dedicated at Stretre Church, near Dartmouth, as memorials of the late Col. Madden. Mr. Harry Hems, of Exeter, executed the works.

The well-known reclining figures by Cibber, R.A., representing "Raving and Melancholy Madness," which have long been on view at South Kensington Museum, having been lent to that institution by the governors of Bridewell and Bethlehem Hospitals, have been presented to the City Corporation, and have, therefore, found their final location in the Guildhall Museum.

Stained-glass has been placed in the two large windows beside the pulpit of Infirmary-street Church, Edinburgh, to the memory of Rev. William Bruce, D.D., minister from 1838 to 1882. The subjects of these windows are "Gethsemane," and the "Resurrection." The designs and execution are by Messrs. James Ballantine and Son, Edinburgh.

For the sanitary rehabilitation of Naples operations will at once be initiated, to extend over an estimated period of ten years. The rookeries standing in the four sections of Porto, Pendino, Mercato, and Vicaria will be demolished, and new dwelling-houses erected in their room. The drainage will also receive attention, and the water supply be regulated on a new system.

The building operations in connection with the erection of a new church at Llanllwchaearn, were commenced on Tuesday week. Mr. Edwin Davies is the contractor.



### STAINED GLASS.

ENFIELD.—A large stained-glass window, the gift of Mr. Edward Hunter, has recently been placed in Enfield Parish Church. The subject is the "Redemption of Israel out of Egypt," as typical of our redemption from the bondage of Sin and Death. The series of events commences with Moses and the Israelites coming up safe from the Red Sea, and concludes with the entrance into the Promised Land under Joshua. The work is from the studio of Messrs. Powell Bros., of Leeds.

### STATUES, MEMORIALS, &c.

THE GORDON STATUE. — This memorial, which was informally unveiled on Tuesday, is the work of Mr. Hamo Thornycroft, A.R.A., and is placed in position in the centre of Trafalgar-square, midway between the fountains. The statue, which is in bronze, is 10ft. 6in. high, and the total height of the monument is 29ft. The pedestal is wrought in hard Derbyshire limestone, standing upon two granite steps. The pedestal, in designing which Mr. Thornycroft had the assistance of Mr. Alfred Waterhouse, R.A., is adorned with bronze panels and with a sculptured frieze. The panels represent four virtues, Fortitude and Faith, Charity and Justice, modelled in the style of the Italian Renaissance. Gordon, in undress uniform and bareheaded, stands in an attitude of meditation. His chin rests upon his right hand; the left hand supports the right arm, and holds a Bible; while the well-known rattan cane, with which he won his battles in China, is thrust under the arm. The left foot is raised, and rests upon a fragment of an old howitzer.

### CHIPS.

The new workhouse infirmary at Birmingham was formally handed over to the board of guardians on completion on Tuesday by Messrs. Bissett and Son, of Sheffield. Among those present were Messrs. W. H. Ward, the architect, and Mr. K. J. Osborne, the clerk of works. The building was illustrated in the BUILDING NEWS for Feb. 3, 1888, and has cost about £60,000.

A serious outbreak of fire occurred on Tuesday morning on the premises of Messrs. Esdaile and Company, known as the City Saw Mills, in Wenlock-road, Hoxton. A large brick and timber building of one floor, about 150ft. by 80ft., used as saw mills, has been destroyed, the contents burnt out, and the roof burnt off; of a brick building of three floors, 50ft. by 20ft., used as drying rooms, the upper floor is burnt out, and part of roof off, the rest of building and contents being severely damaged by fire; carpenters' workshops of one floor, 40ft. by 40ft., and the contents, side, front, and roof of veneer mills, and stock in yard were damaged by fire and water.

Star-lane Congregational Chapel, Stamford, was reopened on Sunday week after alterations and improvements. The work included rearranging of the gas-fittings and the taking away of the old pulpit, for which has been substituted a rostrum and platform combined, constructed of pitchpine, with mahogany handrails. This part of the work was intrusted to Mr. H. Corby. The carving was done by Mr. Rippon.

The foundation-stone of the new church of St. Gabriel, building in the Bryn-road, Swansea, was laid on the 27th ult. The building will be perpendicular in style, and will be seated for 600 persons. Eventually the nave and aisles will be extended westward, and a tower added, and the accommodation increased to 800 or 900. The architects are Messrs. Nicholson and Son, of Hereford. The contractor is Mr. Smith, of Kidderminster. The cost of the present undertaking is about £5,000.

The School Board for Bootle, near Liverpool, met on Friday for the first time in their new offices. They have been erected by Messrs. Sinclair from plans and under the superintendence of Mr. Cox.

The members of the Architectural Association of York recently visited the church of the Holy Trinity, in Micklegate, under the guidance of the president, Mr. W. Hepper, and inspected the new chancel and the other additions recently erected from the designs of Messrs. Fisher and Hepper.

It has been decided to erect additional buildings in connection with Dover Hospital at a cost of £3,000 or £4,000. The accepted designs for the buildings are by Mr. W. Leonard Grant, of Sittingbourne.

St. Elwyn's Church, John, Cornwall, erected from the designs of Mr. John D. Sedding, of Oxford-street, W., Mr. Stanlake, of Plymouth, being the builder, was consecrated by the Bishop of Truro on Tuesday week. The church was illustrated and described in the BUILDING NEWS for May 28, 1886.

## Our Office Table.

At their meeting to-day (Friday) the Metropolitan Board of Works will consider and decide upon what Bills shall be promoted during the ensuing session of Parliament. The schemes recommended by the Works Committee are four in number, and all are street improvements, two referring to Kensington, and two much smaller ones to Deptford. The proposals are (1) the widening of Kensington High-street, between St. Mary Abbots' Church and Palace Gardens, at an estimated net cost of £169,000; (2) widening Old Brompton-road from South Kensington Station to Cranley-place, estimated cost £46,000; (3) widening Mill-lane, Deptford, estimated cost £14,000, and (4) the extension of Freadly-street, Deptford, to the Greenwich-road, estimated cost £12,000. The same committee will report that in their opinion it is inexpedient at present to prepare schemes for dealing with certain areas in Bell-lane, Whitechapel; Great Pearl-street, Whitechapel; Horseferry-road, Greenwich, and four acres in Shore-ditch, recent inquiries having shown that in all these districts there are numerous vacant rooms suitable for artisans and labourers, and that no urgent necessity exists for dealing with the areas; and will recommend that no improvement schemes, under the Artisans' Dwellings Improvement Acts, be prepared for the next session.

MR. JOHN FOWLER, chief engineer to the Tees Conservancy Commissioners, died at his residence, at Preston-on-Tees, on Thursday in last week, dropsy being the cause of death. Mr. Fowler was a native of the Aberdeen district, and was sixty-five years of age. He was an assistant engineer to the old Tees Navigation Company, and had been chief engineer to the Tees Conservancy Commissioners almost ever since the establishment of that body in 1852. Mr. Fowler achieved important engineering results on the Tees. He found the river difficult of navigation even by the smallest trading vessels, and made it a stream of great commercial importance, navigable for a considerable distance by cargo-carrying vessels of the largest type. The works include the construction of many miles of training walls, which confine the waters within proper limits, and make the stream navigable at all states of the tide; the reclamation of large tracts of land, available for agricultural and other purposes; the construction of a graving dock of large dimensions; the erection of the South Gare Breakwater (to be opened on Thursday next by the Right Hon. W. H. Smith, M.P.), and the partial construction of the North Gare Breakwater. The works carried out by Mr. Fowler have cost at least a million sterling. Mr. Fowler's services were in frequent request in consultation on the conservancy of other rivers. The deceased leaves a wife and six sons.

SOME workmen who have been engaged in erecting a boathouse for Mr. Burrell, at the junction of the Carbridge Creek with the Botley river, near Southampton, have come across; a few feet beneath the surface, an ancient canoe, 12ft. long, and 2½ft. wide, hollowed out from the trunk of a tree, the wood being as black as ebony. Two miles from the spot lie the remains of an ancient Danish war galley, found there some years since, and probably this canoe belonged to the galley. The canoe has been removed with the greatest possible care. It being discovered in the bed of the river below high water mark, a question of ownership has arisen. The Government claimed the ancient Danish wreck, and marked it with the broad arrow.

THE West of Scotland Technical College authorities and the district council, acting in conjunction with the Plumbers' Company, have started technical classes for plumbers. The introductory lecture was delivered on Thursday night in the large hall of the Christian Institute, Glasgow. There was a very large attendance, upwards of 800 plumbers—masters, operatives, and apprentices—from all parts of the district being present. Mr. Thos. Russell, one of the governors of the Institute, presided, and, in introducing the lecturer, urged the students to remember the responsibility for human life which rested with plumbers. The

lecturer was Mr. J. W. Clarke, the first practical plumber who succeeded in obtaining the Company's Freedom by passing in honours the prescribed examination in the principles and practice of the craft. Professor Jamieson and several of the governing body of the institute were present, and it was mentioned that upwards of 700 plumbers had already been registered in the district. Our old contributor, Mr. W. P. Buchan, who was present, offered some good suggestions and to give some prizes, and we believe it is the intention of the Plumbers' Company to distribute a number of copies of his book, a new edition of which is now preparing, and which first appeared in these pages.

### CHIPS.

A new town mission hall has been erected at Harrogate. Special attention has been paid to the ventilation, the latest improved form of Messrs. Robert Boyle and Son's patent self-acting air-pump ventilator being used for the extraction of the vitiated air.

The Mercers' Company have promised £100,000 towards the proposed South London People's Palace in the Borough-road, provided the corporation will grant a lease, at a nominal rent, of the British and Foreign School Society's premises.

With the view of inducing candidates to do better practical work at the City and Guilds of London examinations, the Carpenters' Company offered to purchase specimens of carpentry, should they be recommended by the examiner, and they have just purchased four models. The examiner (Mr. Banister Fletcher, F.R.I.B.A.), in his report, mentioned that usefulness of the models depends upon their practical size and the power of taking them to pieces, so that the joints may be examined by the students.

The initial step in the construction of the line of railway from Guiseley to Yeadon and Rawdon was taken on Tuesday week, when the first sod was turned. The contract has been let to Mr. Nowell, of Preston, and the line will be completed by next August.

The room under the new dome of the Edinburgh University has been handed over to the Professor of Fine Arts, who has converted it into a museum, small but well arranged, of comparative sculpture. Circular in form, the room is 30ft. across and about 20ft. high.

On Saturday afternoon the Wesleyan Methodists of Seaham Harbour met together on the site of a new Sunday-school adjoining their spacious chapel in Tempest-place for the purpose of laying the foundation-stones of the building. The cost will be over £500. The contractor is Mr. James Armitage, Southwick.

In a recent number we announced the death of Mr. Edgar Varley, the curator of the Royal Architectural Museum. We now record the sudden death, on Thursday week, of Mr. Isaac Edwards, who was appointed curator to the museum about three weeks since. Mr. Edwards assisted Messrs. Carpenter and Slater for many years, and remained in the same office till about two years ago. He was about 60 years of age, and his death was due to apoplexy.

On Saturday the members of the North-Western district of the Association of Public Sanitary Inspectors paid a visit to Warrington, where they inquired into the sanitary arrangements of the borough. The visitors were received at the town hall by Alderman Burgess and by Mr. T. Longdin, the borough surveyor of Warrington. Mr. Longdin explained the system adopted in Warrington for dealing with the refuse of the town. The party then drove to the gasworks, where the compressed air is generated by means of Shone's system, to the south intercepting works and to the manufacturing depot at Longford. A visit was afterwards paid to the Infectious Diseases Hospital.

For some time negotiations have proceeded between the Marquis of Bristol and the Corporation of Brighton for the purchase by the latter body of the Tenantry Down, which comprises the racecourse. This has been completed at a cost of £3,000, and the Race Stand Trustees have sent the town council, as a gift, a cheque for the purchase money.

At the Oxfordshire Quarter Sessions on Monday, the Earl of Jersey made a formal presentation of an oil painting, by Mr. Carter, of the chairman, Mr. C. E. Thornhill. The portrait has been placed in the grand jury room at the County Hall.

New board of guardians' offices in St. James's-road, Dudley, were opened on Friday. The buildings are of red brick with terracotta dressings, and cost £3,503. Messrs. Wood and Kendrick, of West Bromwich, were the architects, and Messrs. J. H. Bate and Son, of Dudley, the builders.



## MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Academy. Lecture on Anatomy, No. 5, by J. Marshall, F.R.S. 8 p.m.

FRIDAY.—Royal Academy. Lecture on Anatomy, No. 6, by J. Marshall, F.R.S. 8 p.m.

## CHIPS.

After an interval of more than eleven years Mr. Ruskin is once more staying in Vienna, and is staying at the Hotel d'Europe. He is out all day in his gondola, and is received with warm appreciation by Venetians.

The town council of Devonport, who recently acquired by purchase from the representatives of the original builder the well-known Column in that borough, have just completed the rearrangement of the approaches and surroundings of the monument. The works have been carried out by Mr. J. Healy from plans prepared by Mr. F. J. Burns, the borough surveyor.

During the present session of the Manchester Association of Engineers, which opens with a social meeting on Saturday, papers will be read by Mr. J. A. Bennion, Mr. Thomas Ashbury, C.E., Mr. James Bolas, Mr. Alderman Bailey, Mr. C. P. Brooks (Blackburn), Mr. M. T. Corby, and others. The president's inaugural address, following the annual meeting on the 8th December, will be delivered on the 12th January, 1889.

New Salvation Army Barracks are being built in River-street, Buckingham, at a cost of £2,000, from plans by Mr. Wallace, of Southampton. Messrs. Hayward and Son, of Bedford, are the contractors.

At the annual meeting of the Incorporation of Mary's Chapel, near Edinburgh, held on Monday, Mr. Robert Paterson, architect, was elected deacon of the masons, and Mr. John White, plumber, was elected deacon of the wrights, for the ensuing year. Mr. White was at the same time also re-elected treasurer.

James Dolman, bricklayer, secretary of the Bricklayers' Society, pleaded guilty, at Shrewsbury, on Monday, to a charge of obtaining by false pretences, on May 25 last, the sum of £10 17s. 5d., the moneys of the Shrewsbury branch of the Operative Bricklayers' Society. Prisoner also pleaded guilty to embezzling various sums of money, amounting to £1, belonging to the same society. He was sentenced to ten months' imprisonment on both charges.

The Dundee Technical Institute, built in University College grounds, from funds bequeathed by Sir David Baxter, was formally opened on Monday by Mr. Swire Smith, of Keighley. The cost of the building, not including the machinery, has been £7,600.

The list of receiving orders in Tuesday's *Gazette* includes the name of John Edward Stafford, of Burnley, architect, surveyor, and civil engineer, formerly borough surveyor and engineer.

The twentieth annual exhibition of turnery, under the auspices of the Turners' Company, will be held at the Mansion House on Wednesday next and two following days, and the prizes will be presented on Friday in next week at noon by the Lord Mayor. The competition this year will be in turning in diamonds, glass, stone, and pottery, and the company's prizes will be supplemented by gifts of the Baroness Burdett-Coutts, Mr. Burdett-Coutts, M.P. (the Master of the Company), Sir C. Hutton Gregory, and others.

A special meeting of the Irvine District Road Trustees was held on Monday in the Council Chambers, Irvine, for the purpose of appointing a surveyor in room of the late Mr. David Patrick Dalry. There were fifty-two applications. Mr. John Armour, junior, architect, Irvine, was ultimately elected by 17 votes against 12 for Mr. Charles Mitchell, Kilmarnock.

The new Baptist church just completed at the corner of George-square and Argyle-street, Greenock, was opened for public worship on Sunday. The building was built from plans by Mr. Campbell Douglas and the late James Sellars, architects, Glasgow, and is Classical in style. The main entrance is from George-square. The church itself is seated for 500, and a large hall on the basement floor (to be used as a Sabbath school) 250, there being also a smaller hall to hold 100 people.

A lecture-hall and manse are being added to the East Cliff Congregational Church, Bournemouth, and other improvements to the church and schools are in progress. Messrs. Lawson and Donkin, of Bournemouth, are the architects, and the tender of Mr. J. W. Mannell, of the same town, has been accepted for the execution of the works, the outlay being about £3,600.

## Trade News.

## WAGES MOVEMENTS.

EDINBURGH JOINERS AND ORGANISATION.—In the Trades' Hall, Edinburgh, on Friday, a crowded meeting of joiners was held—Mr. Laidlaw presiding—for the purpose of "considering the absolute necessity of their being better organised." After a long discussion, it was unanimously resolved to hold a series of meetings in various districts of Edinburgh during the winter, with the view of promoting organisation and for the discussion of trade matters. A large committee was appointed to make the necessary arrangements.

Holloway's Pills.—Easy digestion.—These admirable Pills cannot be too highly appreciated for the wholesome power they exert over all disorders of the stomach, liver, bowels, and kidneys. They instantaneously relieve and steadily work out a thorough cure, and in its course dispel headache, biliousness, flatulence, and depression of spirits.

Garside's Noted Bedfordshire Coarse and FINE SILVER SAND.—Is perfectly free from impurity, and the best and cheapest in the market. All qualities in stock, for every purpose required in the building trade, for filtration, or for nursery purposes. All pure grit!—Apply to GEORGE GARSIDE, Junr., F.R.H.S., Leighton Buzzard.

## DOULTING FREESTONE.

THE CHELYNCH STONE.—The Stone from these Quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable Stones in England.

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## HAM HILL STONE.

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HYATT'S LENS and "SEMI-PRISM" LIGHTS FOR PAYMENTS, STALLBOARDS, ROOFS, &c. TILE and GLASS LIGHTS in beautiful designs.—THADDEUS HYATT, Manufacturer, 9, Farringdon-road, London, E.C.

## WM. OLIVER &amp; SONS,

MAHOGANY, WAINSCOT, WALNUT, TEAK, VENEER, and FANCYWOOD MERCHANTS,

120, BUNHILL ROW, LONDON, E.C.

The most extensive Stock of every kind of Wood in Planks and Boards, dry and fit for immediate use.

## TENDERS.

\* Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

ASHFORD, KENT.—For the erection of 15 houses in Beaver-road:—Knock, Ashford (accepted).

BANGOR.—For the supply of iron pipes for the extension of the water intake:—Fernistown and Co., Stourbridge (accepted).

BLACKHEATH.—For erecting stables and coach-houses at Combe Farm-lane, Blackheath, for Mr. J. Murray. Mr. J. J. Downes, 183, Lewisham High-road, architect:—Lorden, W. H., and Son (accepted) £1,600 0 0

BRIXHAM, DEVON.—For board school buildings, to seat 900 children, for the Brixham School Board. Mr. G. Soudon Bridgman, M.S.A., Torquay and Paignton, architect:—

Lapthorn and Goad, Plymouth	£4,882 0 0
Yeo, E., Torquay	4,467 0 0
Webber, H., Paignton	4,450 0 0
Sanders and Son, Torquay	4,300 0 0
Goss, W. A., Torquay	4,182 0 0
Bridgman, M., Paignton	4,049 0 0
Rabbith, H., Paignton	3,999 18 0
Brooks and Ash, Totnes	3,999 0 0
Bovey, E. P., Torquay	3,996 0 0
Barrow, Newton Abbott	3,910 0 0
McKellar, Torquay	3,895 0 0
Vanstone, F. W., Paignton	3,849 0 0
Hazlewood Bros., Brixham	3,780 0 0

\* Recommended for acceptance.

(The cost, including ground, architect's, and other fees, is £5 per child.)

BROMLEY, KENT.—For the erection of four shops and offices in High-street, Bromley, for Mr. D. W. Harris. Mr. W. A. Williams, Bromley, Kent, and 26, Budge-row, E.C., architect. Quantities by Mr. W. Mills, 26, Budge-row, E.C.:—

Payne, D., Bromley (accepted) ... £4,500 0 0

BROMLEY COMMON, KENT.—For alterations and additions to the Bromley Steam Brewery, for Mr. J. A. S. Jones. Mr. W. A. Williams, Bromley, Kent, and 26, Budge-row, E.C., architect:—

Smith, W. (accepted) ... £160 0 0

BROMLEY, KENT.—For the erection of a residence, conservatory, heating chamber, &c., in the Highland-road, Bromley, Kent, for Mr. G. Kitchen. Mr. W. A. Williams, Bromley, Kent, and 26, Budge-row, E.C., architect. Quantities by Mr. W. Mills, 26, Budge-row, E.C.:—

Payne, D., Bromley ... £3,581 0 0

Crossley, T., and Son, Bromley ... 3,446 0 0

Arnold, J. C., and Son, Bromley ... 3,397 0 0

Gregory, T., and Co., London ... 3,377 0 0

Roome, E. A., London (accepted) ... 3,197 0 0

CHELTEMHAM.—For the supply of fittings to the free library, for the town council:—

Billings and Co. (accepted).\*

\* Contractors for the building. Two lower tenders received, one of which, from Ashbee and Son, Gloucester, was withdrawn after acceptance.

GOUROCK, N.B.—For the construction of a new railway station at Gourock:—

Kennedy, H., and Sons (accepted).

HALIFAX.—For erecting a retaining wall at Swan Bank for the town council:—

McKnight, J. S. (accepted) ... £82 13 0

HARROW, MIDDLESEX.—For alterations at The Case is Altered, for Messrs. Benskin and Co., of the Cannon Brewery, Watford. Mr. C. F. Ayres, Watford, architect:—

Nail, W. B., Watford ... £441 0 0

Beechener, H. W., Harrow ... 385 0 0

Waterman, G. and J., Watford\* ... 366 0 0

\* Accepted.

HOLMFIRTH.—For proposed alterations and reseating of Lanc Ind pen'ent Chapel, Holmfirth. Mr. J. Berry, 9, Queen-street, Huddersfield, architect:—

(Accepted tenders.)

Masons:—

Marsden, F., and Sons, Bingley Quarries.

Joiners:—

Booth, R., and Haigh, J., Upperbridge.

Plumber:—

Tolson, J., Upperbridge.

Plasterer:—

Newton, Bottomley.

Painters:—

Quarby, J., and Sons, Victoria-square.

Rest of Holmfirth.

HYTHE, KENT.—For carrying out the St. Leonard's-road drainage works:—

Webster, Folkestone ... £1,000 0 0

Wallis and Sons, Maidstone ... 640 0 0

Amos, W., Hythe ... 591 10 0

Scott, J., Hythe ... 580 0 0

Wilson, Walthamstow (accepted) ... 459 0 0

IPSWICH.—For repairs and decorations at Alan-road Chapel, for the trustees:—

Crisp and Smith (accepted) ... £99 10 0

ISLE OF WIGHT.—For widening the road at Birchfield, for the Isle of Wight highway commissioners:—

Alexander, J. W. ... £80 15 0

Kingswell, J. ... 78 10 0

Coker, F. S. (accepted) ... 77 10 0

IVY HATCH.—For residence, Ivy Hatch, Kent. Mr. E. J. Hall, F.R.I.B.A., 57, Morgate-street, London, architect. Quantities by Messrs. Evans and Deacon, 1, Adelaide-street, W.C.:—

Foster and Dicksee ... £6,789 0 0

Langdale and Hallett (accepted) ... 6,500 0 0

KENSINGTON.—For the making up, metalling, &c., of Highlevier-road and Stoneleigh-street, for the vestry of Kensington. Mr. W. Weaver, surveyor:—

Tomes and Wimpey ... £234 0 0

Nowell and Robson ... 257 0 0

Mears ... 230 0 0

Rogers and Co. (accepted) ... 202 0 0

LEICESTER.—For the erection of new board schools at Aylestone, near Leicester. Messrs. Roberts and Gordon, Welford-place, Leicester, architects:—

Stevens ... £6,240 0 0

Duxbury and Son ... 6,187 0 0

Jewsbury ... 6,119 0 0

Kellett, J. C., and Son ... 6,036 0 0

Herbert, T., and H. ... 5,860 0 0

Plant ... 5,830 0 0

Bland, T. ... 5,830 0 0

Hutchinson and Son ... 5,825 0 0

Longden and Son ... 5,780 0 0

Bland, H. ... 5,770 0 0

Clark and Garrett ... 5,709 0 0

Kellett, W. H. ... 5,697 0 0

Hewitt (accepted) ... 5,320 0 0

LONDON.—For alterations, new roofing, and decorative repairs to No. 3, Milton-buildings, Watling-street, London, E.C. Mr. H. Huntly-Gordon, A.R.I.B.A., 26, Craven-street, Charing Cross, London, W.C., architect and surveyor:—

Colley, B. (accepted with alterations) ... £550

LONDON.—For a new staircase and alterations to Nos. 6 and 7, Noble-street, Lilyot-lane, E.C. Mr. H. Huntly-Gordon, A.R.I.B.A., 26, Craven-street, Charing Cross, London, W.C., architect and surveyor:—

K. Roy and Chase ... £169 0 0

Eddie, R. ... 137 0 0

LONDON.—For building a sludge ship capable of carrying 1,000 tons of sewage sludge and discharging the same out at sea in all weathers, for the Metropolitan Board of Works:—

Naval Construction and Armaments Co., Barrow-in-Furness (accepted) ... £24,785 0 0



<b>Railway Stations.</b>	<b>Broadstone, Dublin</b>	<b>Ealing Terminus</b>	<b>Kenilworth</b>	<b>Monkwearmouth</b>	<b>Slough</b>	<b>Westminster</b>	<b>Dublin Castle</b>	<b>Schools, &amp;c.</b>	<b>Stratford, Col-</b>
<b>Accrington</b>	<b>Bardett Road</b>	<b>Barl's Court</b>	<b>Kensal Green</b>	<b>Moorgate-street</b>	<b>Soho</b>	<b>Whitechurch</b>	<b>Police Barracks</b>	<b>Belfast Method-</b>	<b>grave Road</b>
<b>Acton Green</b>	<b>Barrough Junction</b>	<b>Edgware Road</b>	<b>Kenilworth Town</b>	<b>Monument</b>	<b>South Bromley</b>	<b>Whitechapel</b>	<b>Eastney</b>	<b>ist College</b>	<b>Stratford, Sal-</b>
<b>Aldersgate-stree</b>	<b>Burton</b>	<b>Fairlow Road</b>	<b>Kilburn</b>	<b>Newcastle-</b>	<b>South Kensington</b>	<b>Whitefield</b>	<b>Fleetwood</b>	<b>Battersea, St.</b>	<b>way Place</b>
<b>Aldgate</b>	<b>Bury</b>	<b>Farringdon</b>	<b>Kilbury</b>	<b>ton</b>	<b>South Kensington</b>	<b>Whitley</b>	<b>Fulwood</b>	<b>Mary's Church</b>	<b>Sutton</b>
<b>Althorp Park</b>	<b>Borough Road,</b>	<b>Fenchurch</b>	<b>King's Cross</b>	<b>under-Lyne</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Halifax</b>	<b>St. Jude's</b>	<b>Tayport</b>
<b>Altrincham</b>	<b>Mersey Tunnel</b>	<b>Fenchurch</b>	<b>King William</b>	<b>New Cross</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Birmingham,</b>	<b>Torrington</b>
<b>Aston</b>	<b>Canonbury</b>	<b>Finchley Road</b>	<b>Street</b>	<b>Newport</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	<b>Upton Cross</b>
<b>Ash Street,</b>	<b>Camden Road</b>	<b>Finsbury</b>	<b>Langley Green</b>	<b>Newton Heath</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	<b>Wandsworth</b>
<b>Stockport</b>	<b>Chalk Farm</b>	<b>Forest Gate</b>	<b>Latimer Road</b>	<b>North Brantford</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Birmingham,</b>	<b>Charing Cross</b>	<b>Forest Road</b>	<b>Lea Bridge</b>	<b>North Bridge</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>New Street</b>	<b>Cheddington</b>	<b>Level Crossing</b>	<b>Leamington</b>	<b>Northampton</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Banbury</b>	<b>Cheetham Hill</b>	<b>Fulham</b>	<b>Leman Street</b>	<b>(Castle Station)</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Barnsbur-</b>	<b>Junction</b>	<b>Geedley</b>	<b>Leyland</b>	<b>Nottingham</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Barnsley</b>	<b>Chequerbent</b>	<b>Gloucester Road</b>	<b>Leyton</b>	<b>Oldbury</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Batley</b>	<b>Clayton</b>	<b>Gower Street</b>	<b>Leytonstone</b>	<b>Old Ford</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bedminster</b>	<b>Clifton</b>	<b>Grantham</b>	<b>Lichfield</b>	<b>Oldham (Mumps)</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bescot Junction</b>	<b>Clitheroe</b>	<b>Greenwich</b>	<b>Limchouse</b>	<b>Paddington</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Birmingham</b>	<b>Crewe</b>	<b>Hackney</b>	<b>Lincoln</b>	<b>Parsons Green</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bishopsgate</b>	<b>Crooked Billet</b>	<b>Haggerston</b>	<b>Little Baling</b>	<b>Piccadilly</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Blackfriars</b>	<b>Level Crossing</b>	<b>Hammersmith</b>	<b>Liverpool Road,</b>	<b>Piccadilly</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Blackfriars</b>	<b>Cross Lane</b>	<b>Heaton Park</b>	<b>Manchester</b>	<b>Pickle Bridge</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bridge</b>	<b>Crumpsall</b>	<b>Hereford, Barr's</b>	<b>Liverpool Street</b>	<b>Pleak</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Blake Street, Sut-</b>	<b>Cullercoates</b>	<b>Court</b>	<b>Llandudno</b>	<b>Plymouth</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>ton Coldfield</b>	<b>Cannon Street</b>	<b>Highbury</b>	<b>Long Buckby</b>	<b>Poplar</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Blaydon-on-Tyne</b>	<b>Dalston</b>	<b>Hillgate Road,</b>	<b>Loudoun Road</b>	<b>Portsmouth</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bletchley</b>	<b>Daubhill</b>	<b>Hollinwood</b>	<b>Ludgate Hill</b>	<b>Prestwich</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bolton</b>	<b>Daybrook</b>	<b>Hollyhead</b>	<b>Mark Lane</b>	<b>Radcliffe</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bolts Bridge</b>	<b>Denholme</b>	<b>Homerton</b>	<b>Maidstone</b>	<b>Road</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bombay, India</b>	<b>Derby</b>	<b>Horslow</b>	<b>Manchester, Ex-</b>	<b>change</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bow</b>	<b>Droylesden</b>	<b>Horley</b>	<b>Manchester</b>	<b>Manchester</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bowdon Central</b>	<b>Drighlington</b>	<b>Hounslow Bar-</b>	<b>Manchester</b>	<b>Manchester</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Brick Lane</b>	<b>Dudley</b>	<b>Keighley</b>	<b>Mansion House</b>	<b>Midmay Park</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Bristol</b>	<b>Dudley Port</b>	<b>Kemble Junction</b>	<b>Millhill</b>	<b>Milverton</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Broadfield</b>	<b>Dundee</b>	<b>Ealing Common</b>	<b>Kenilworth</b>	<b>Kenilworth</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	
<b>Broad Street</b>	<b>Ealing Common</b>	<b>Kemble Junction</b>	<b>Kenilworth</b>	<b>Kenilworth</b>	<b>South Kensington</b>	<b>Widnes</b>	<b>Hamilton, Glas-</b>	<b>Clapham</b>	

<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
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<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
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<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
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<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
<b>Barracks.</b>	<b>Aldershot</b>	<b>Ashton-under-Lyne</b>	<b>Barnet</b>	<b>Belfast</b>	<b>Burnbrook</b>	<b>Burdley</b>	<b>Catherham</b>	<b>Chatham</b>	<b>Chester</b>	<b>Coventry</b>	<b>Curragh Camp</b>	<b>Dublin, Beggars'</b>	<b>Bush</b>	<b>Dublin, Island</b>	<b>Bridge</b>	<b>Dublin, Ship</b>	<b>Dublin, Street</b>	<b>Dublin, Royal</b>	<b>Barracks</b>	<b>Dundalk</b>
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# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

VOL. LV.—No. 1764.

FRIDAY, OCTOBER 26, 1888.

### INLAND NAVIGATION.

THE length of inland navigation by rivers and canals is about 4,000 miles in Great Britain, as given lately by Sir Douglas Galton at the Society of Arts, of which 1,445 miles belong to canal companies, 927 miles to public trusts, and 1,333 miles are under the control of railway companies. Most of these—that is, more than 1,000 miles—passed under that control before the year 1853, when the first railway and canal traffic Act was passed by Parliament. The canals have been much neglected, and in many cases suffered to fall into disuse. There are 188 miles of canal now derelict, and 119 miles have been converted into railways. The canals, indeed, have been practically ignored for the last fifty years, but the Government of France, Germany, and Belgium have been much more alive to the importance of water communication. These Governments have acquired, and are improving, their principal water routes, with great advantage to the public welfare, and in the United States water communication continues to compete successfully with railways, and affords a check upon the rates of traffic carried on railways. The whole experience of inland navigation on the Continent, and in America, and in this country shows that if the transit by canal is to be cheap the canals must be of adequate size.

Mr. L. F. Vernon-Harcourt, C.E., read a paper on "Canal Engineering: Its Past, its Present Aims, and its Prospects in the Future," in which he showed that the size of craft which can traverse a through route depends on the least navigable depth in the canal and over the sills of the locks, and the least width and length of any lock on the route. Unfortunately, very few through canal routes exist in England which are not obstructed by some narrow locks or shallow portions of canal, rendering the comparatively good width and depth of the remainder quite unavailable for a larger craft. In France the same want of uniformity of gauge on the waterways existed; but as almost all the waterways are under the control of the State, improvements and extensions have been made, and in 1879 a law was passed for providing a uniform depth of 6½ft., locks 126½ft. long and 17ft. wide, and a clear height of 12ft. under the bridges throughout the principal lines of waterways. The works for securing this uniformity are being gradually carried out, and when they are completed 300-ton barges, 126½ft. long, 16½ft. wide, and 6ft. draught, will be able to traverse all the principal waterways of that country.

The canalisation of the Upper Seine, between Montereau and Paris, was only undertaken in 1860, whereby a depth of 5½ft. was obtained, and yet in 1878 a further increase of depth to 6½ft. was decided upon. The navigable depth on the Lower Seine has been successively increased to 5½ft. and 6½ft., and works are now in progress for obtaining a depth of 10½ft. between Paris and Rouen, suitable for vessels of 800 to 1,000 tons. The time occupied in passing through a lock on the French canals used to amount to from 16 to 20 minutes at least. The time is spent in filling or emptying the lock, in closing and opening the lock gates, and in passing the barge into and out of the lock chamber. The adjustment of the water level in the lock chamber may be hastened by large sluices in the side walls of the lock. The moving of the lock gates can be rapidly effected by

hydraulic machinery. Delays have been experienced in dragging a barge into or out of the lock when it is nearly the width of the lock chamber, owing to its acting like a piston, and preventing the flowing back of the water along the sides; but this inconvenience can be obviated by carrying the culverts for the sluiceways all along the side walls, and providing lateral openings through which the water finds an exit. Locks provided with sluiceways running the whole length of the walls have been constructed on the Aire and Calder navigation, on the Scheldt and Meuse canal, and the Canal du Centre of France. These large sluiceways insure the rapid filling or emptying of the lock, and by making several side openings along the side walls into the lock chambers the inflowing and outflowing currents are distributed so as to have no injurious effect on the vessel inside. Balanced cylindrical sluice gates, rising and falling vertically in a circular well communicating with the sluiceways, have been adopted at the new locks of these two foreign canals, for opening and closing the sluiceways easily and rapidly. The enlarged locks on the Canal du Centre can be filled or emptied in two minutes, and the passage of vessels through the locks takes less than half the original time.

The largest canal locks hitherto contemplated are those designed by Col. Blackman, for the proposed Nicaragua canal. They are 700ft. long, 100ft. wide, and with 30ft. depth of water over the sill, whilst the lift proposed is from 50ft. to 120ft. The filling of the lock chamber is to be rapidly effected through 18in. cast-iron pipes, built into the side walls along the whole length on each side, connected across the bottom of the lock chamber by a series of pipes perforated with 2in. holes, from which the water will be distributed over the whole area of the chamber in numerous small streams, so as to avoid any prejudicial agitation of the water. The emptying is to be similarly effected, and when a saving of water is important the pipes will discharge at the lower end into a series of long ponds, formed in terraces, so that most of the water may be used again for filling the lock. These arrangements are a large extension of the system of sluiceways, all along the side walls, with lateral openings, and of side ponds already referred to. The most novel feature is said to be the form of the caisson gate, to be constructed of wrought iron and steel, which, being increased in width towards the bottom, becomes stronger in proportion to the depth as the water-pressure increases. A canal incline consists of two lines of way laid on a steep uniform gradient, on which barges are drawn up or let down by wire cables from some reach of the canal to the next, either resting on a cradle or floating in a caisson which runs on wheels on the incline. The cables wind round a drum at the top of the incline, and the ascending barge is generally more or less counterbalanced by another descending, whereby the tractive force required to pull the barge up is considerably reduced. Primitive inclines exist on the Bude Canal in Yorkshire, and some inclines were established on the Shropshire canal towards the end of the last century; but they are carried out on the most extensive scale on the Morri's canal in America, where there are 23 inclines, with gradients of 1 in 10, and an average lift of 58ft. The adoption of hydraulic lifts for canals appears to be growing in favour. A simple lift with two counterbalancing troughs was adopted on the Great Western Canal many years ago, but it was subsequently abandoned, and the first hydraulic lift was erected at Anderton, in 1875, for connecting the river Weaver with the Trent and Mersey canal. The difference of level is 50½ft., and the barges are raised or lowered in two wrought-iron troughs, 75ft.

long, 15½ft. wide, with 5ft. depth of water, each resting on a central hydraulic ram, 3ft. diameter, working in two hydraulic presses underground, which can be connected at pleasure, making the troughs counterbalance one another. One trough accordingly ascends as the other descends, the motion being imparted by removing 6in. depth of water from the lower trough; and only the final lift, of about 4½ft., has to be effected by hydraulic power.

Mr. M. B. Cotsworth contributed a paper on the "Rise and Progress of Canal and River Navigation in Great Britain and Ireland," from which it appears that evidence exists of very early river navigation in England, in the old boats found at Brigg, York, Wakefield &c., which are proved to date back to the time of the Ancient Britons. The Thames, the Severn, the Trent, the Ouse, and other rivers were the means of transit long before the time of the Romans, who were so far advanced in inland navigation as to cut canals 40 miles in length, as instanced in the Caerdyke, between Peterborough and Lincoln, and also to build docks, as shown in the old dock walls still standing at the outfall of the river Trym, into the Avon below Bristol. Locks were invented by the Italians in 1481, on the Brentua, near Padua, but were not used here; for, in 1539, when the first English canal was cut by the Corporation of Exeter, three miles in length, it was left open to the ebb and flow of the tide. The English canals date from the time James Brindley began, under the instructions of the Duke of Bridgewater, to form the canal from Worsley to Manchester, the Act for which was passed in 1759, and afterwards from Manchester to Liverpool, or rather to Runcorn, where it joins the Mersey by a series of ten locks, the Act for which was passed in 1762. Then followed the Trent and Mersey Canal in 1766, and many more in succession—as the Birmingham Canal in 1768, the Oxford Canal in 1769, the Leeds and Liverpool in 1770, Ellesmere and Chester in 1772, Aire and Calder in 1774, the Erewash Canal in 1777, the Thames and Severn in 1783. Brindley died in 1772, but he did an enormous amount of canal work in those thirteen years, as, for instance:—

Worsley to Manchester .....	10½ miles
Longford Bridge to Runcorn .....	24 "
Trent and Mersey Canal .....	89 "
Staffordshire and Worcestershire Canal .....	46½ "
Coventry Canal .....	37 "
Birmingham Canal .....	24½ "
Droitwich Canal .....	5½ "
Oxford Canal .....	82½ "
Chesterfield Canal .....	46 "
Leeds and Liverpool (consulted upon) .....	127 "
Thames and Severn .....	31 "

523 "

In the year 1815 Macadam introduced his system of repairing roads, which led to an increase of competition between roads and canals as means of carriage; but as the result was the creation of increased trade throughout the country, the canals were rather benefited than otherwise.

A very good paper was read by Mr. G. R. Jebb, C.E., the engineer to the Birmingham Canal Navigations, and to the Shropshire Union Canal, on the "Maintenance of Canals." The Birmingham canal is 162 miles in extent, taking all its ramifications over the "black country" of South Staffordshire, and last year it carried 7 million tons of cargo. The works to be maintained are the waterway of the canal itself, the embankments, towing paths, locks, bridges, tunnels, aqueducts, culverts, weirs, sluices, buildings, cranes, wharves, warehouses, docks and quay walls, reservoirs and works in connection with the water supply of the canal. The highest main-level canal, called the Wolverhampton canal, is 473ft. above the mean level of the sea. The Birmingham level is 453ft. above the same datum, and the Walsall level 408ft.



A very large amount of traffic daily passes between the Wolverhampton and the Walsall levels. It appears that on these canals the same water is used over and over again in passing boats through the locks, by pumping the water back into the upper levels. There are, in different places, altogether 24 engines, capable of pumping 3,713 locks of water per day, a volume which is equal to 92 million gallons, and that it is not at all unusual for upwards of 2,000 locks in a day to be actually pumped.

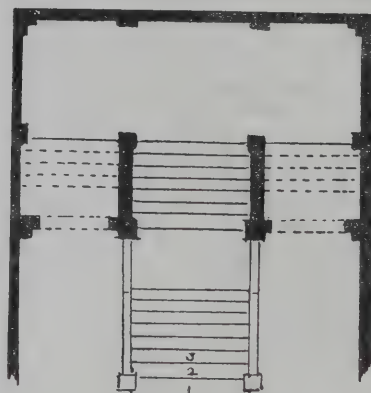
Mr. E. J. Lloyd, C.E., engineer and manager of the Warwick and Birmingham and the Warwick and Napton Canals, followed with a paper on "Inland Navigation in Great Britain," and said that over the considerable area extending from the Mersey on the north to the Thames on the south most of the canal locks are of a gauge 72ft. by 7ft. The present classification of goods carried on canals is most anomalous; a low toll is usually fixed for lime and limestone, which was no doubt done in the interests of the owners and occupiers of land; but with regard to other classes of traffic, scarcely two canals follow the same classification. On one canal the rates for coffee, tobacco, silk, and Irish linens are in the lowest class; but bar iron, sheet iron, and coals are in the highest class. On another canal brick and stone are in the lowest class, coal and lime the second, and all other commodities the third and highest; and he considered that the want of a uniform classification of goods is one of the impediments to the future utility of canals, as it prevents through rates being negotiated for any class of goods.

#### HALLS AND STAIRCASES.—VII.

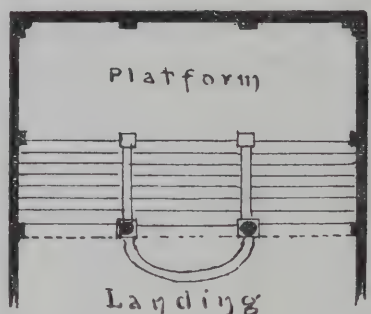
ONE of the difficulties in the design of a staircase which is to occupy a central and prominent position is to impart to it a structural character—to make it, in short, appear as part of the building, instead of a subordinate erection put up afterwards, conflicting with every line of the architecture which surrounds it. The latter appearance is that which unfortunately belongs to most of the staircases of private and public buildings. They lack massiveness and coherence. They have too much of the upholstery look about them; the cast-iron balustrade and the carpet which covers the steps are thrust forward, the whole affair being utterly out of unison with the architecture. Much of the disagreement arises from the affectation of lightness, the trying to make the stairs a sort of acrobatic feat, self-supporting, without any apparent means being visible. According to this idea, the flights are often long and unsupported by walls or pillars, the newel open and of the well-hole type, the handrail winding or curvilinear. The solid or pierced masonry newel has been considered repugnant to this lightness by a number of architects who like *tour-de-force* displays. Others, however, who seek to make the staircase an integral part of the structure, can admire the solid or pierced spandrel and newel. For the public building in which a monumental character is desired, added to real and apparent strength, no other form of staircase is so appropriate. We have records of open stone stairs breaking off at the wall when crowds have descended in a stampede, or when fire has taken a hold of the building. The public staircase ought to be of stone, or something akin to it; if of wood, it should be solid; above all, solidity of support seems to be essential, but we cannot realise this quality when we have open spandrels or unsupported steps resting on the landings. When, therefore, we are dealing with a public staircase, and desire strength and stateliness, the solid spandrel or pierced wall enables us to obtain the wished-for effect. From an architectural point of view, the supported

flight can be made to unite with the architecture in an easier manner than the open stairs. Examples of the pierced newel or spandrel stairs are numerous. Some of the earlier stone stairs in the Scottish castles are of this type. There are many beautiful circular stairs with masonry newels. The circular stairs to the lower courts of the

Plan 18



Ground Plan

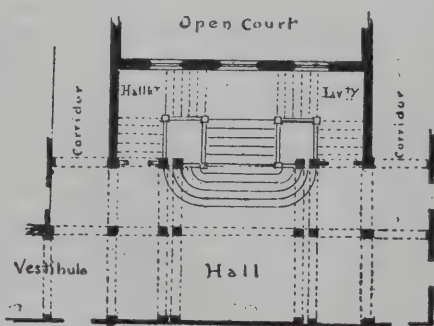


Landing

Royal Courts of Justice, London, have pierced stone or arcaded newels. Many good examples of supported flights are to be seen in Italian palaces and churches. One of the best known Italian staircases of the solid spandrel type is to be seen in the courtyard in the Doge's Palace, Venice.

A beautiful variety of this arrangement is that in which the solid wall gives place to a row of columns or arches, noticed also in some of the Italian palazzi. Where a

Plan 19



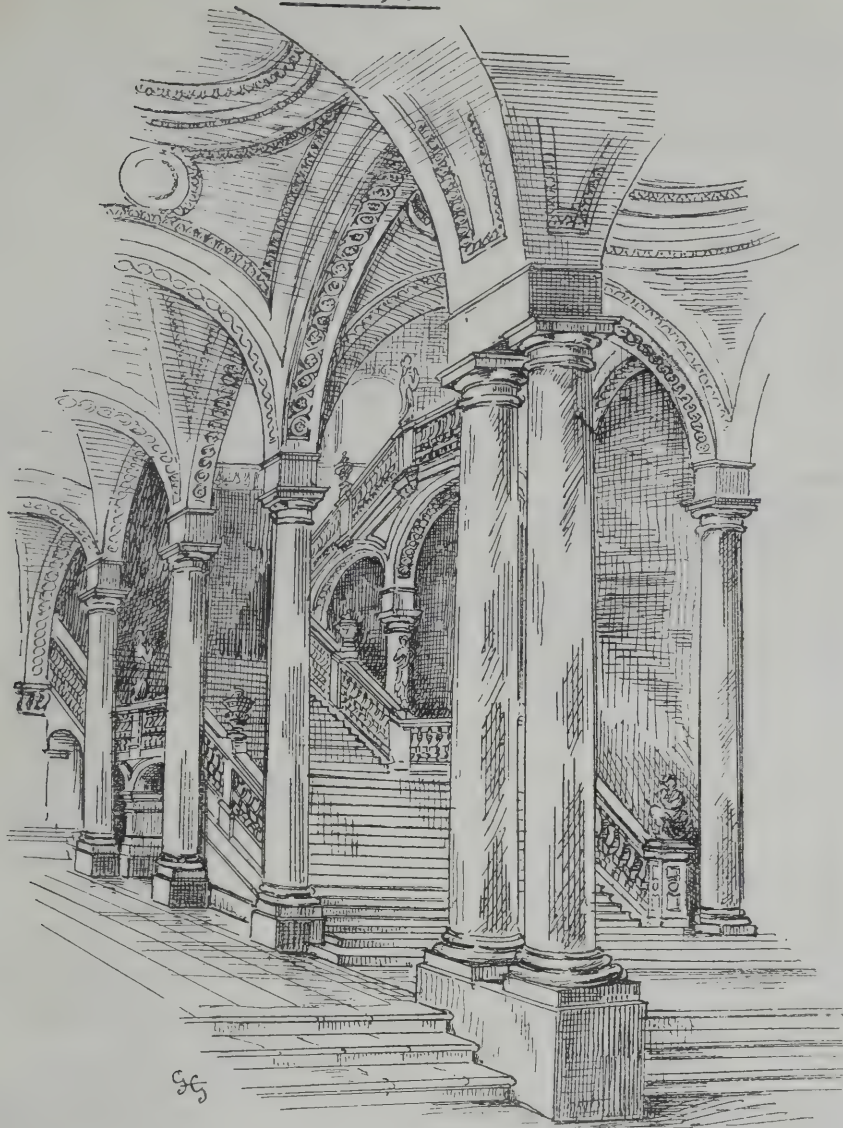
landing occurs in a long flight of stairs, the landing is sometimes supported by columns, combining all the lightness of the open stair with strength and architectural grace. In the type of stair planning in which there is a centre and two wing flights this treatment may be made effective, or instead of columns, piers and arches can be employed to carry the upper flights. A very fine instance of this arrangement is noticed in the grand staircase of the Royal, originally

Episcopal, Palace at Wurzburg, in Germany, sketched on opposite page. This palace was erected, according to Murray's "Handbook of Southern Germany," by two bishops of the family of the Counts Schönborn, 1720-40, and is of great size and unusual magnificence. Its architect was a German—John Balt'r Neuman. The staircase which our sketch represents is very stately and original in design, and is of polished marble. The two hundred and eighty-four apartments in the building, including the suite formerly occupied by the Emperors of Germany on their way to coronation at Frankfort, are distinguished for the gorgeous display of gilding, marble, Gobelin tapestry, silken draperies, and mirrors. The chapel is a rich specimen of Louis XIV. decoration, and the whole edifice is a remarkable evidence of the wealth and splendour of the ecclesiastical princes of the empire nearly to the end of the last century. The main points of interest in this staircase and hall are the stately marble columns and arches which flank the central flight of stairs, the solid spandrel walls below the balustrades, and the upper return flights carried on ramping arches on each side. The flanking columns, it will be noticed, support arches which carry the sides of the upper flights, the arches being accommodated to the gradient of the stairs. The ceiling is groined. Nothing can be more stately than this mode of arranging the side colonnades, while they serve to support the staircase. Gracefulness and stability are thus attained; the high windows at the end of hall throw light down and up the main flights.

Returning to consider the smaller examples of centre and return flights, we have noticed the manner in which the return stairs can be treated so as to screen their soffits by side arches. A simple arrangement of this sort is shown in our plan No. 18. Here the centre stairs is broken into two short flights by a middle landing. Up to the latter the balustrades on each side are carried, where they stop against pilasters. Above the landing spandrel walls are introduced, filling up the spaces between the lower and upper flights, while below these, fronting the entrance, arches are turned, the upper part of which cuts off a large portion of the view of the soffits of these flights, while they give support to them. The inclosed spaces on the ground floor thus formed may be made vestibules to rooms behind the staircase, or be utilised as cloak-rooms or lavatories. The inclosing spandrel walls in the plan we show are thus returned to carry the ends of the upper flights, and columns are carried at the angles on the upper floor (above the pilasters), against which the upper balustrades are finished. A dignified landing is thus secured, and the staircase emphasised. The arcaded spandrel combines light appearance with strength and elegance, the arches are generally made to ramp with the flights so as to avoid the stiling that would be necessary in the regular curve. When the spandrels are small, one flat ramping arch abutting against a massive newel can be introduced, the effect being that of the flying-buttress. These curves obviate the straight line, and to a certain extent conceal the soffit of the stair. A recently-constructed public staircase of this kind is to be seen in the central hall of the Natural History Museum at South Kensington, where single arches are introduced under the wing or branch flights. There are, therefore, two modes of treating staircases in which solidity and architectural effect are aimed at: one is to support the outer ends of the steps on a wall—we have called this the solid or spandrel wall staircase; the other to substitute for the wall, columns or arches resting on pillars, ramping with the flight. Some beautiful examples of square and circular staircases show this treatment, which we have called the pierced spandrel or



Sketch 20



newel, the stairs in this case being inclosed on the outer side by a screen of columns and arches or pierced tracery.

As illustrating the type of stairs indicated by diagram C, page 331, we may mention the new staircase of the Leeds Municipal Buildings and Art Gallery by Mr. W. H. Thorpe, architect, in which two lateral flights give access to a landing, from thence a central flight reaches the first floor. The columns which separate the stairs form newels to the balustrades, and the centre upper flight is concealed by the entrance doorway. By backing the staircase to the front wall, the landing may be so arranged as to height as to allow the inner door to be placed under the upper central flight. The advantage is, as we have pointed out in speaking of private halls, that the stairs are not directly seen from the vestibule; good light also can be admitted from the front. Other types of staircase arrangement based on the square plan may be briefly noticed here. The celebrated staircase at the Hotel de Ville, St. Quentin, which we illustrated some time ago, shows a very beautiful example of a square plan, with flights flanked by pillars which support arches and cross vaults. The hall is, in fact, divided into compartments by the pillars which carry a groined ceiling. As a further modern instance of a stair carried on spandrel walls, and separated from the hall by an arcade, we may notice the grand stone staircase of the Shakespeare Memorial, Stratford-on-Avon, designed by Mr. W. F. Unsworth, a perspective view of which was given in the BUILDING NEWS, June 27, 1884.

The peculiar feature of this staircase is that the flight is supported on a spandrel wall, relieved by three ramping arches filled in. Above the stairs are corresponding piers with Purbeck marble shafts, supporting pointed moulded arches, which rake with the stairs. The bases of piers are filled in below with a masonry screen or balustrading, pierced by arches trefoiled, the openings having grilles. The treatment is essentially architectural in its character. While speaking of treatment here, we may recall the grand staircases of the Italian Cinque Cento age in England of the 16th century. Those who know the fine staircase of Burleigh House, Northamptonshire, with its raking barrel vault and groined landings and pendants, or the grand open newel staircases like those of Westwood House, Warwickshire, with the newels carried up as Corinthian columns; or the staircases of Knowle, Kent, Crewe, or Aston Hall, can realise the invention and picturesqueness that is displayed in these internal designs. To the student of this interesting phase of architecture, the three consecutive periods of Elizabeth, James I., Charles I., are particularly rich in staircase design. Of these periods which form the Transitional epoch of Domestic architecture, extending from the middle of the 16th to the middle of the 17th century, we have a host of noble examples, including, besides those named, Longleat, Hardwick Hall, Hatfield, Audley End, Holland House, and numerous others. Of later Renaissance and Revival examples, we can name many that indicate ease in ascent, good planning, and massive treatment, though less

picturesque and retired than the Elizabethan and Jacobean structures. We shall leave further notice of some of these to our future remarks on Domestic work and details.

#### THE WELDON STONE.

A NUMEROUS party of architects and representatives of the Press were invited last Friday by the Earl of Winchilsea and Nottingham to Kirby Hall and the Weldon Stone Quarries. The visit to the historic ruins of this great house was certainly the principal inducement to many of the well-known architects who responded to the invitation. Many of those present—among whom we noticed Mr. Chas. Barry, Mr. Penrose, Mr. Ewan Christian, Mr. Blomfield, Mr. Roumieu Gough, Mr. Hadfield (of Sheffield), and Mr. Crickmay—had never seen Kirby Hall, and, therefore, the visit was of more than ordinary interest. Kirby,\* built for Sir Christopher Hatton, and completed by John Thorpe, the architect, had been partly erected by the Stafford family. It was afterwards enlarged by Inigo Jones, whose hand we notice in the inner quadrangle and in many of the details and cornices, and these different phases of style were closely scanned by the visitors. A very interesting collection of manuscripts and books were inspected in one of the fine circular bay window rooms looking over the lawn, and tracings of plans of the house were shown by Mr. Gotch, showing the alterations and notes of the architect, John Thorpe. This plan shows suggested alterations that were not all carried out. Much admiration was bestowed on the details, the delicate mouldings and cornices of some of the rooms, the fine mullioned bays, the finials of the Elizabethan gables, though the general regret was that so noble and fine a residence of this interesting period should have been sacrificed to the greed of one of the later occupiers. The present representative of the Hattons had, with commendable respect for the traditions and beauty of this noble house, preserved it from further mutilation and disfigurement, and from feeling and interesting remarks at the luncheon given in the time-honoured hall by the Earl of Winchilsea we gather that his intention is not only to preserve it from further injury, but, if the means were forthcoming, to carry out a conservative and intelligent restoration of the fabric. So fine a specimen of the Italian Renaissance as the courtyard is to be seen in few other houses, though its preservation and quaintness of detail are attributable to the excellent stone with which it is built, and the sharpness of the carved work. A very moderate outlay some years ago might have saved the injury which the ravages of the weather have made on the structure, whose roofless walls have not even the lateral support necessary to hold them together. The visit to Rushton Hall and the Triangular Lodge, built by Sir Thos. Tristram, was of equal interest to architects. But the main object of the invitation given by the Earl was to introduce to the notice of the visitors the excellent stone of the building, and its state of preservation at Kirby. This material is quarried in the district. The Weldon quarries, which the Earl has opened and intends to develop have long been noted in the Midlands for the quality of the stone. The same stone has been used not only at Kirby Hall, but in many fine buildings and churches in the district, including Lyveden, Rushton Hall, Rothwell Market House, and Geddington Cross, St. Dunstan's Church, Fleet-street, and it is thought old St. Paul's Cathedral were built of it. Evidence of the use and quality of this stone is abundant. In Murray's "Northamptonshire" we read of the freestone quarries that they have been worked from an early period. "The stone belongs to the uppermost beds of the Inferior Oolite, and is best known as 'Ketton stone' from the quarries in Rutland, just beyond the Northamptonshire border. This is one of the most important building stones in the kingdom, and is composed entirely of small egg-shaped grains embedded in a calcareous matrix. It is very easily worked, of a good cream colour, and very durable, hardening under atmospheric exposure."

\* The house has been illustrated in the BUILDING NEWS of Feb. 25, April 7, and May 12, 1876; Aug. 11, 1882; and Jan. 23, 1885.



This description agrees with the evidence of the buildings visited, and the testimony of the quarry itself. The new workings which have been opened near Weldon Station exhibit a stone of considerable depth on the bed, and of good texture and hardness. There are three varieties turned out. The best, the "A 1" quality, is from the lower bed, from which stones of considerable size have been cut, several of about 100ft. cube and more. The "A" quality is suitable for general face work and mouldings; "B" is a coarser quality. The blocks we saw at the quarries are large, free from flinty veins, and of cream or light brown colour, which in buildings assume in time a nice warm grey tint, very agreeable to the eye. The quarries produce also a variegated limestone, with blue veins, which admits of a good polish, known as the "Weldon rag," which is adapted for columns and chimneypieces, as well as for walling. The opinions of those who have used the freestone are favourable. Mr. John L. Pearson, R.A., says he is satisfied with its "enduring qualities," and likes its texture and colour. Mr. Arthur W. Blomfield, M.A., says he has long known and used the Weldon stone, and has a high opinion of its durability. Messrs. Gotch and Saunders, of Kettering, have used the stone for the completion of the Market House at Rothwell, and in other buildings, and they say it is improved by time, and is easier to work than Bath stone. These evidences as to the value of Weldon freestone are important, as architects look not so much to scientific theories as to experience and practical working. The prices, too, are moderate. The best selected stone is quoted at 1s. 4d. per cubic foot on rails; the second quality 1s. 2d., and the coarse quality 1s. per foot. The sawing is said to be 12 per cent. cheaper than Corsham. The rate for carriage at purchaser's risk at St. Pancras Station is 6s. per ton, or 4½d. per cubic foot. The new quarries have at least been opened with some prospect of success.

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XVI.

By HENRY LOVEGROVE, F.S.I., Surveyor.

AS a little relief from the monotony of dimensions, I give herewith the abstract of Excavator and Bricklayer, all prepared ready for billing, and afterwards continue the dimensions of Carpenter and Joiner.

### EXCAVATOR, &C.

Cube, dig, and cart from surface.	
5362 6	
198 17 Do. from foundations.	
1856 5	Do part fill and ram.
167 6	3491 11
2023 11	621 7
74 26	4113 6
	154 10

Cube dry brick rubbish, filled, well rammed, and levelled.

3326 6	
123 6	

Cube concrete in foundations.

1856 6 Sup. bed of do. 6in. thick, spread and levelled	
167 6 under wood block flooring.	
2023 11	2567 2 Deduct.
74 26	797 8 21 3
	71 6
	33 0
	3469 4
	21 3
	3448 1
	393 1

### DRAINS.

3in. salt-glazed drain-pipes with Stanford's patent joints and digging, average 2ft. deep.

172 0	4in. do. do. do.
76 0	6in. do. 3ft. deep.
198 0	9in. do. 5ft. do.

100 0 Extra to bends.

3in.	
10	

Ends R.W.P. mg. to drain.

6	Connect ends of pipes with brick chamber.
2	30
8	
6in.	siphon trap with cleaning arm and cap and fixing in drain.
7	Entry into sewer, including G.I. flap and frame built in in cement for 9in. pipe, and pay fee.
1	Hellyer's patent gullies and fixing.
2	Do. grease traps and do.
2	Do. 3 do.
1	Do. 4 do.
2	Do. 5 do.
3	

### INSPECTION CHAMBER.

Cube dig and cart.	
592 0	Concrete.
132 0	112 0
524 0	24 0
19 11	136 0
	5 1

Sup. P. and S. to sides of excavation.

784 0	
210 0	
994 0	

Reduced brickwork in cement.

1 B.	1½ B.	Extra to segmental arch in two half-brick rings.
15 9	15 9	
3 11	3 3	4 2
167 6	19 0	
6 6	164 1	
45 6	173 1	
2 0		

Render in Portland cement.

231 2	122 6	Do. cir. soff.
77 1	30 0	1 11
164 1	152 6	
	17	Run A. and arris.
		Do. cir.
		2 6

Run 9in. by 6in. tooled and rebated curb and setting in cement, including joints.

63 0 Dishing up axed culverts in cement.

3 Dyer's air-tt. cover 2ft. by 1ft. 6in. and fixing in stone curb.

### BRICKLAYER.

Reduce stock brickwork in mortar, including all rough cutting.

1 brick.	1½ brick.	Deduct.	
		1 brick.	1½ brick.
283 0	283 0	119 0	89 5
46 0	23 0	317 4	81 0
77 0	21 6	513 4	144 0
1472 0	38 6	37 4	9 5
245 9	6037 4	23 9	18 2
742 0	560 0	140 0	5 3
97 11	922 8	49 0	35 11
15 0	260 0	21 0	64 3
2213 0	70 0	40 6	19 4
248 11	463 2	37 6	8 6
115 0	65 4	82 6	25 3
51 0	82 8		
6 8	6 10	1381 3	490 11
5613 3	8844 0		
1381 3	490 11		
4232 0	8353 1		
1410 8	2821 4		
2821 4	11174 5		
	41 22		

Do. extra only in cement.

1 brick.	Half brick wall in cement.	Do. trimmer arch do.
51 0	35 0	33 4
17 0	43 6	
34 0	118 3	
	196 9	

Sup. extra to red brick facings as described and ptg.

2788 5	Deduct.
91 11	390 0
574 9	215 8
4228 10	67 5
7683 11	98 0
1635 7	42 0
6048 4	24 0
	84 3
	162 0
	351 0
	18 9
	11 3
	44 0
	80 0
	47 3
	1635 7

Extra to relieving arch over lintel in cement.

6 0	Do. to axed flat arch in stocks.
6 5	12 11
23 8	
6 5	
12 9	34 11
55 3	6 0
	10 8
	51 7

Do. segmental do. do.

34 11	Do. cir. do.
6 0	61 0
10 8	
51 7	

Extra to cut, rubbed, and gauged flat arch in red bricks.

7 0	Do. segmental do.
5 11	46 8
12 11	79 1
	7 9
	33 1
	2 9
	169 4

Damp-course as described.

685 1	6in. red Staffordshire tiles, bedded and jointed in cement.
134 3	

819 4

797 8	Deduct.
71 6	21 3
33 0	
902 2	
21 3	
880 11	
98 yds.	

Run. Labour fair cutting on red brick facings.

12 10	Circular do. over arches.
60 0	54 0
28 0	68 0
28 0	9 0
4 8	24 0
6 0	155 0
9 0	
3 0	
161 6	

Edge of 6in. conc., ldg., cut and pinned in cement.

3 3	

Run circular cutting and waste on do.

14 0	

Extra to red brick moulded string, one course high.

70 0	Do. circular over arches.
82 0	37 0
162 0	20 Int. mit.
6 2	4 Stopped ends.
99 2	2 Do. on splay.
	2 Moulded rebated ends.
	24 24
	24 24
	50 4
	52

Rw. and pt. flashings.

136 0	Deduct.
22 0	64 0
24 0	30 8
30 0	6 0
24 0	14 0
236 0	50 8
64 0	
172 0	

Nos. Extra to rounded reig. arches over chimney bar in cement.

5	Ends R. I. J. C. and P. in cement.
2	Extra labour, forming pilaster, 4½in. wide, 2½in. projection, and 9ft. 9in. high, in red brick facings.
2	Extra to cut and rubbed swelled friezes in red bricks, 6in. by 24in.
2	Red brick, carved and moulded cornels, 12in. by 9in. by 9in. at ends of pilasters.
2	

Frames b. and pt.

12	Flues p. and core.
12	11
2	
4	
4	
6	
1	
2	
47	

PATENT CONCRETE.

Sup. 6in. landing.	
11 5	Room 12in. by 6in. square steps.
75 0	Winders 3ft. 4in. by 3ft. 4in., by 6in.
4	Ends, steps built in in cement.
40	Do. winders do.
2	

DIMENSIONS—(CONTINUED).

ft. in.	ft. in.
6 7	79 0
3 9	45 0
5 0	30 0
5 0	10 0
5 0	30 0
5 9	34 6
5 0	30 0
1 10	22 0
3 2	38 0
7 6	90 0
1 8	
1 7	31 8
1 10	
3 2	69 8
10	
4 4	
7	15 2
4 4	
4 4	26 0
4 4	
6	13 0
2 0	
2 0	12 0
2 0	24 0

6 by 4½ fir wrought and framed front to dormer.

Labour to rebate.

4½ by 4 fir-framed head.

Planing to fir and (4).

9 by 4½ fir wrought, framed, rebated, moulded B.E. transom.

12 Ends of do. sunk, with moulding returned mitred and s. on front.

12 Sunk ends with moulding s. at back.

7 by 4½ fir wrought framed double rebated transom moulded on front edge.

12 Sunk returned moulded ends as before.

4½ by 4½ fir wrought, framed, double rebated and beaded mullion.

7 by 4 oak wrought, framed, sunk, weathered, rebated, beaded, grooved, and moulded on front edge sill.

12 Ends sunk with moulding mitred returned and s.

Labour to S. rebate 4 gt. for case-

ment.

48 S.

Deal wrought mitred bead to fix iron frame with brass cups and screws.

12 Wrought-iron frame and case-

ment in small squares hung on centres 1ft. 11in. by 1ft. 11in. and fixing in wood frame and (4) and (4) and twice V.

12 Elsiey pt. casement opener.

Lead lights and glass in iron casements.

2in. double moulded casements in small squares with wide bars hung on butts.

12 pr. 3in. butts.

12 brass lever casement fastener.

12 Do. do. stay.

21oz. sheet glass in small squares.

1½ deal wrought window bd. and bars with rounded nosing tongued to sill.

12 N. and returned rounded ends.

Deduct bold flush bd. in Portland cement.

12 S.E.

Deduct Prtind. cement trowelled smooth for paint, and (4) dado.

Cement lining narrow.

Lr. rounded angle in cement.



ft. in.	ft. in.		ft. in.	ft. in.		ft. in.	ft. in.	
4 7	114 7	L. P. F. S. and twice colour cheeks of dormer.	4 1	1 10	Add qrs.	3 6	9	Add post.
4 2	67 0	Keene's cement rounded angle.	4 4	53 8	lin. deal ro. close-jointed bdg. cheeks of dormer for lead.	4 4	3 5	Fir framed head sill and intertie
12 5 7	41 2	Deduct R. F. S. and twice colour.	3 10	42 0	R.C. and W. to do.	13 6	2 8	Add do.
4 4	145 2	Deduct L. P. F. S. and colour.	5 3	5 0	Fir-framed ceiling joists.	4 4	12 0	Add posts.
1 7	15 2	L. P. F. S. and twice colour over window.	5 0	21 8	(4).	10 6	3	Add do.
4 4	106 2	L. P. F. S. and twice w. ceiling.	4 2	16 8	Add.	9 0	1 2	Add intertie.
4 1	14 0	lin. deal wrought fascia over window and (4).	10	8 4	Add.	4 4	9	Add post.
4 0	7 0	Fir framed in S.L. over window.	2 6	21 8	(4) and twice V.	51 0	2 7	Add head and sill.
7 3	3 5	Fir framed purlin in S. L.	10	14 5	Add.	4 4	1 2	Add intertie.
4 6	27 0	6 by 2 deal plugged to wall as pitching piece.	4 4	8 4	Add.	14 0	6 0	Fir framed quarters.
3 3	12 0	Fir-framed head, &c., cheeks of dormer.	2 6	17 4	Add.	6 6	2 1	Add.
4 1	2 9	Add qrs.	1 0	40 0	9 by 2 fir wrought framed barge-board.	4 4	11	Add.
3 6	80 6	lin. deal ro. close-jointed bdg. cheeks of dormer for lead.	5 0	40 0	2 by 1 deal moulding planted on face of bargeboard.	9 6	6 0	Fir framed quarters.
3 10	63 0	R.C. and W. to do.	1 8	4 M.	8 Returned moulded ends.	4 4	2 1	Add.
1 9	15 9	lin. deal rd. close-jointed bdg. for lead cheeks to lower part.	5 0	20 0	Ornamental vertical tiling to gables and battening or boarding.	8 6	1 0	Add.
1 6	33 0	Raking C. and W. to do.	1 0	8 0	Cutting and waste.	3 0	6 0	2in. deal moulded fixed sash.
2 9	48 0	lin. deal close-jointed bdg. for lead flat under window.	2 6	29 4	Raking do. and do.	2 0	4 10	Fluted glass in small squares.
4 0	85 6	Splayed edge to lin.	3 8	20 0	DL. tilter for tilting.	1 9	16 0	1 by 3 deal wrought and wood lining, tongued and grooved.
4 9	57 0	Fir-framed ceiling joists.	5 0	20 0	Double course tiles in cement.	2 9	4 6	4 by 1 deal wrought and rounded window board, tongued and grooved.
5 0	82 6	1 B. deduct for window.	6 0	42 0	5lb. lead apron.	8 0	4 0	4 notched and rtd. ends.
6 7	65 10	(4).	1 9	24 0	R. and P.	2 3	20 0	Labour to groove.
5 0	25 0	Add.	36 9	73 6	Deal tilting fillet.	10 0	31 0	Deduct L. P. F. S. and twice C partition.
5 0	60 0	Add.	11 6	23 0	Add.	2 2	4 4	Deduct bolded flush bead in cement dado and (4).
1 0	26 3	(4).	87 0	174 0	Add.	2 9	1 10	Deduct Portland cement dado and (4), as before.
5 3	25 0	Add.	9 6	19 0	Deduct do.	3 0	14 3	2in. deal moulded fixed sash next stairs.
10 10	72 6	(4) and twice V.	5 6	11 0	Add.	4 9	11 9	Fluted glass.
4 10	65 0	Add.	2 9	5 6	Add.	4 5	25 0	3in. by lin. deal wrought tongued and rounded, lining as before.
4 4	26 0	Add.	2 9	5 6	Add.	12 6	6 6	4 by 1 deal wrought rounded tongued and grooved window board as before.
1 0	26 0	Add.	16 0	128 0	Add gables.	3 3	6 6	4 notched and rtd. ends.
3 3	26 0	6 by 4 1/2 fir wrought, and 1 frd. front.	7 8	14 6	Add do.	15 6	31 0	Labour to groove.
3 3	26 0	Labour to rebate.	16 0	4 0	Fir framed head sill and intertie next isolation passage.	3 2	31 2	Deduct L.P.F.S. and twice C partition.
5 0	20 0	4 1/2 by 4 fir framed head.	9 0	5 0	Add quarters.	4 11	4 4	4 Frs. (4) and V.
3 8	29 4	9 by 4 1/2 fir wrought framed, rebated, moulded, B. E. transom as before.	9 0	1 8	Add braces.	8 3	5 6	(4) and V.
5 0	20 0	8 Ends of do. sunk, &c., as before.	6 6	3 3	Add head and sill.	2 3	-2 3	Add.
5 0	20 0	8 Do. to moulding at back as before.	4 4	1 5	Add posts.	6	8 Squares.	12 Squares.
5 0	20 0	8 Ends sunk and moulded as before.	9 6	4 3	Add do.	12 6	8 4	Add.
2 6	10 0	4 1/2 by 4 1/2 fir wrought framed, double rebated and beaded mullion.	4 4	3 8	Add quarters.	3 3	3 3	Add.
1 10	14 8	Lr. to rebate, 4in. girt, stopped, 16 S.	3 0	6	Add.	16 0	472 0	1 1/2 pine wrought flooring in 3in. widths, with splayed heading joints and mitred borders to slabs Nos. 1 and 5.
7 6	60 0	Double wrought mitred bead to fix iron frame as before.	8 0	11	Add quarters.	14 9	219 10	Add No. 2.
1 8	21 1	Lead lights, &c., as before.	2	1 7	Add intertie.	15 3	45 0	Add passage.
1 7	10 1	1 1/2 deal wrought rounded tongued window bd. and bars.	3 0	2 9	Fir framed head and sill, linen rm.	14 5	60 11	Add do.
4 4	76 5	8 N. and returned ends.	16 0	1 4	Add intertie.	15 0	33 3	Add landing.
4 2	5 4	L. P. F. S. and twice C. cheeks of dormer.	4 4	6 4	Add posts.	3 0	18 0	Deduct for stairs.
4 7	44 8	Deduct do.	6 6	9	Add do. over and under borrowed lights.	4 3	20 2	Add linen.
1 4	96 9	Deduct L. P. F. S. and twice C. L. P. F. S. and twice cover window.	4 4	2 1	Add qrs.	4 9	44 7	Add do.
4 4	70 9	L.P.F.S. and twice W. ceiling.	9 6	7	Add do. over and under borrowed lights.	7 9	4 6	Add do. and bearers to doors.
4 1	9 4	lin. deal wrought fascia over window and (4).	2	6	Add over door.	3 0	106 9	Flooring as before, No. 3.
4 0	1 8	Fir-framed in S.L. in gable.	3 0	7	Fir framed head and sill under borrowed light next stairs.	7 0	71 9	Add landing.
2 7	8 0	Fir-framed head, &c., cheeks to dormers.	5 6	5	Add qrs.	1 7	4 9	Add do.
3			4			3 0	33 9	Add passages.
12 0			3 6			11 3	191 9	Add No. 4.
4			4			3 0		
3			2			13 0		
3			2			14 9		



ft. in.	ft. in.	
16 9		
18 9	295 4	Add No. 5.
7 6		Deduct flooring as last for chimney breasts.
1 2	17 6	
5 3		
9 3	11	Deduct do.
8 0		
9 6	0	
4 0	6 0	Flooring as before next stairs.
19 6		
2 190 2		Fir framed joists.
12 4		
9 2		
3 4	8	Deduct do. for stairs.
2 2	6	
3 9		
3 1	5	Fir framed trimmers to stairs.
19 6		
1 2	5	Add extra thickness to do.
4 0		
9 3		
161 0	9	Add under partition.
4 3		
3 15 1		Fir wall plate.
		Mem. Deduct equal additions for trimmers.
13 0		
15 0	35 0	
3 0		
4 0		
2 10 0	20 0	H. B. strutting to 9in. joists.
2 13 0	26 0	

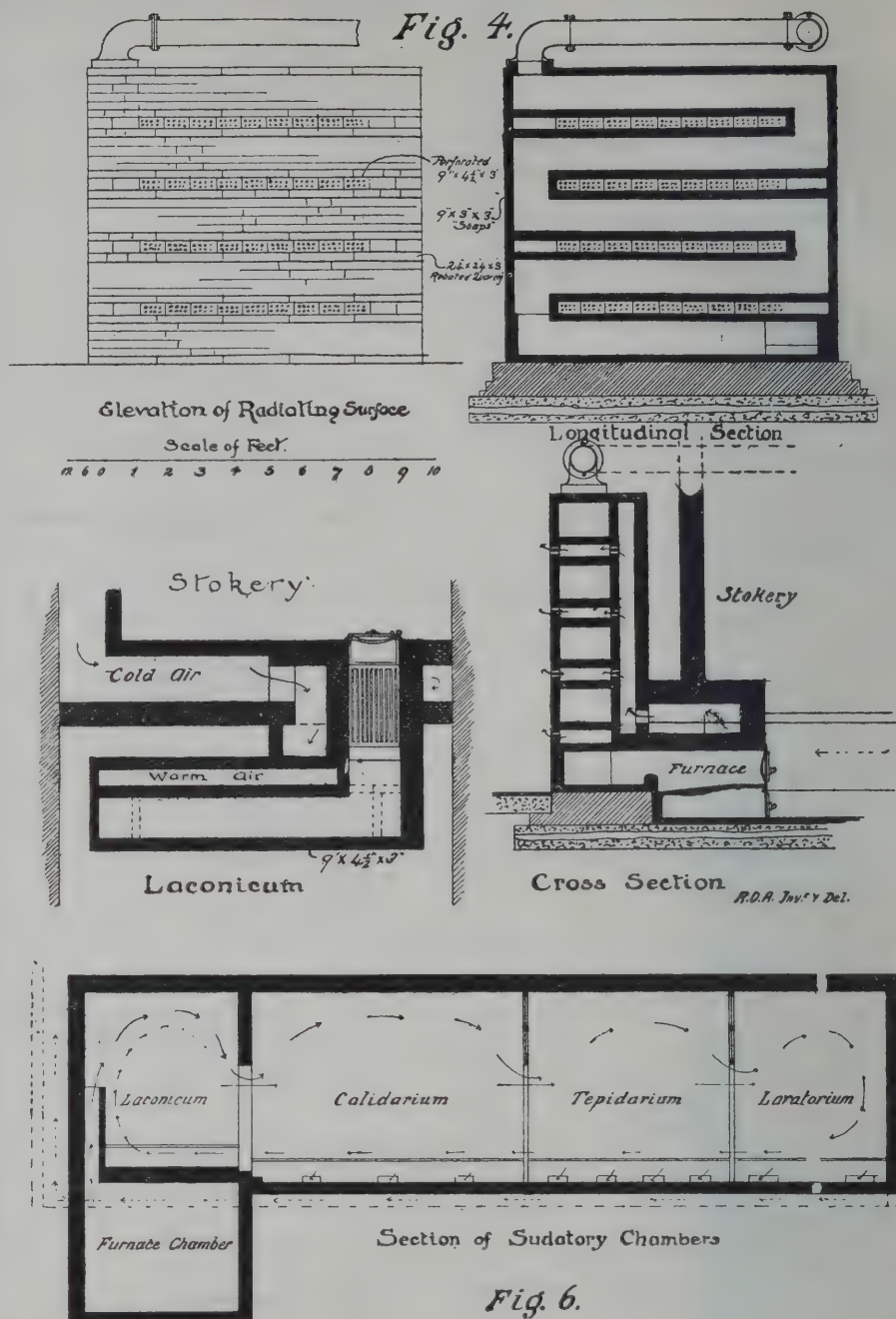
## THE TURKISH BATH: ITS DESIGN AND CONSTRUCTION.

By R. OWEN ALLSOP, Architect.

### VII.—HEATING AND VENTILATION (*concluded*).

IN my last article I illustrated one method of heating the air for a Turkish bath by means of iron stoves, and promised to give drawings of a fireclay heating apparatus. At Fig. 4 I have given the plan, elevation, and sections of such a furnace. It is constructed wholly of fireclay—fireclay bricks, quarries, and cement. In the main it consists of a long flue of fire-bricks and slabs, which coils backwards and forwards over itself till the desired amount of radiating surface is gained. Between the coils are spaces for super-heating the air already warmed by passing over the actual furnace and into the warm air chamber, the air passing through by means of perforated bricks. The illustration shows a simple furnace; but it would be an easy matter to improve upon this by providing iron airtight doors lined with fireclay, for cleansing flues and air-chambers. The example given is only suited to heat a small public bath. For a large set of hot rooms, a compound apparatus could be constructed by placing an additional furnace in a sub-basement, the one on the level of the sudatory supplying radiant heat, and the lower one hot air. Two such apparatuses might be placed one behind the other, end to end, or might form the sides of the laconicum; the last plan, however, being the least to be recommended, as in such positions they would not directly radiate their heat into the adjoining hot rooms.

The advantages of such a furnace as that shown are that it supplies radiant heat of a most exhilarating kind, besides a proportion of heated air, and from a fireclay surface, the employment of which renders it absolutely impossible to overheat the air, or to contaminate it by deleterious particles resulting from the decomposition of metal. Moreover, the stoking of this class of furnace requires less arduous attention than an iron stove. Its disadvantage is that, should the temperature of the bath be allowed to fall markedly, it requires some time for the extra heat to be made up again. Inasmuch, however, as fires at public baths must be kept banked up overnight, this is not a matter of importance. It is this very slowness of increase in temperature that constitutes the safeguard against that burnt air, the presence of which we can, with practice, detect by the smell in so many baths. The difficulties involved in the construction of a furnace of this nature relate to the prevention of cracking and consequent escape of sulphurous fumes and carbon into the air. The very sim-

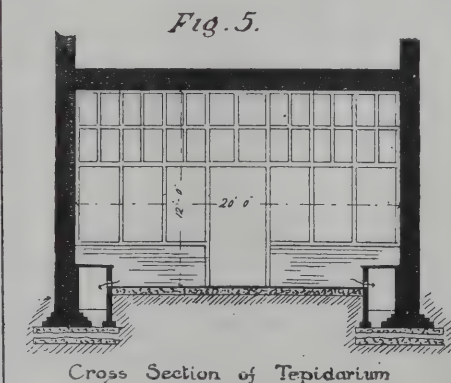


plicity of the construction of the flues and air-chambers constitutes the chief danger, as the chances are that, unless the architect stands by and sees every joint made, the work will be done badly. Absolutely faultless workmanship must be employed throughout, and the fireclay

obtained, having regard to expansion and contraction. The same material used for the bricks, &c., worked into a paste must be employed for the joints.

The design for a furnace on the principle shown at Fig. 4 must be prepared with constant regard to expansion and contraction in heating and cooling. Should this warning be disregarded, fractures will result. It will be seen, upon reference to the plans, that the block of flues and air spaces is left quite free to allow of any expansion, the connection with the smoke-stack being by means of an iron flue-pipe, which, being provided in considerable length before passing through the party-wall of laconicum and stokery, by its flexible nature permits any slight movement in a vertical direction. If an "expansion" joint were provided, there would be a sufficient length of iron pipe if it passed direct from the junction with the heating apparatus into the stokery. So much of the iron flue as is in the laconicum must be coated with asbestos or some composition, or the heating will not be wholly by firebrick. The junction of iron flue and heating apparatus is shown by a cast-iron cap sliding over a projecting rim of fireclay, moulded into the last quarry cover, similar to the way in which cast-iron mouthpieces are fitted to retorts.

This heating apparatus is shown visible in the laconicum, but if thought desirable it could be screened off by a wall of glazed bricks—9in. and miss 4½in. The 4½ by 3in. holes can



materials must be literally of the very best and soundest description. Every single joint must be perfectly made with fireclay cement or paste. The fireclay bricks, &c., must be selected with regard to the amount of indestructible silica in the clay consistent with hardness and toughness. Homogeneity of material must be



be arranged in diamond patterns. This screen-wall, however, cuts off a large quantity of radiant heat.

The first flue past the actual furnace—shown with ordinary dead-plate, raking fire-bars, ashpit, fire-door, and ashpit door for regulating draught—has walls 4½ in. thick; above, smaller bricks, 3 in. wide; but possibly 9 in. and 4½ in., respectively, would be better. The quarries between flues and air spaces are 2½ in. by 2½ in. by 3 in., with rebated joints. Larger covers would be more liable to crack at any provocation.

Other methods of heating the air, besides those mentioned, include coils of iron flue-pipes in a brick chamber—a principle that has been frequently adopted in the past—and plain cylindrical iron radiating stoves, such as employed at the Hammam in Jermyn-street. Batteries of steam-pipes have been suggested. If the iron stove-pipe system is adopted, a furnace similar to the one shown at Fig. 4 must be provided, and after an additional few feet of brick flue the iron pipe would commence and turn back upon itself much as the flue in the fire-brick furnace. Proper supports must be provided; the pipes must be stout and jointed together with expansion joints, otherwise considerable difficulty will be found in keeping a long length of flue pipe perfectly free from leakage.

The most economical way of obtaining a high temperature in a small, inexpensive, and unpretentious private bath is by means of a common laundry stove, with a longer or shorter length of iron flue in the apartment. This is the cheapest and quickest method of raising the temperature of a room for sudorific purposes.

The average temperatures of a public bath should range from about 110° in the shampooing rooms to 250°—260° in the hottest part of the laconicum, taking the readings of the thermometer at the level of 6 ft. 6 in. above floor-line. Between the entrance of the heated air and its point of furthest travel in the shampooing rooms, the bather should be able to select any temperature that may be most agreeable to him, and as many find by experience that a certain degree of heat is best suited to themselves, it shows attention to the *habitus* of the bath, if the hot rooms are carefully maintained at the same uniform temperatures throughout the year. This may be 110°—120° in the shampooing rooms, 140° in the tepidarium, 180° in the caldarium, and 250° in the laconicum. These must be the maximum of the average temperatures of each room at 6 ft. 6 in. above the floor. In a pure atmosphere the highest temperatures are comfortable, but in a foul one they become insupportable.

In a good bath, where there is a rapid and continuous flow of air, there will be comparatively little difference between the temperature at say 4 ft., 6 ft., and 8 ft. above the floor. In badly-ventilated rooms, where the air stagnates, there will be an enormous difference—as much, sometimes, as 20° in the foot. And here we may note a serious objection to the heating of a bath by convection; for while the head may be in a high degree of heat the feet are in comparatively cool air, whereas, if possible, it should be just the reverse. In convected heat, this of course applies in its entirety, as where so-called radiant heat is employed the evil is not quite so marked. And here, too, we may note the admirable nature of the Roman system of heating, where the floors radiated the majority of the heat, and the walls a slightly lesser amount. The fresh air under the ancient system must have entered through the cooler rooms, and being drawn towards the *caldarium*, found its exit through the ceilings, at times, by way of the regulating device mentioned by Vitruvius.

The temperature of a bath should not be regulated by the firing of the furnace. This should be regularly stoked, and kept at one uniform heat-giving condition. Bad firing and forced firing may crack the stove should it be of iron, or, at least, the air may be burnt. The temperature may be regulated by means of the hit-and-miss ventilators at the floor level. In addition, there may be provided a small opening into a flue at the ceiling level of the shampooing rooms, fitted with a fanlight or pivoted glass louver with means of adjustment. Fan-

lights between the various hot rooms, with screw-rod adjustment, serve as a means for regulating their relative temperatures.

In my preceding article I illustrated a method of ventilating a set of hot rooms in an awkward site, and stated that the system of ventilation there shown could be improved. In principle, however, the plan shown is as effective as could be. I referred to the arrangement of extraction flues. This could be improved by constructing culverts under the marble-topped benches as at Fig. 5. The coolest and heaviest air sinks to the bottom of this channel. These flues can run under the floors in any way most convenient, and irrespective of walls and partitions.

The whole principle of the ventilation of the hot rooms of a Turkish bath resolves itself, primarily, into the fact that we have to continually remove the bottom layer of air. The provision of the foul-air conduits below the floor level is equivalent to providing a suspended floor with a hollow space under. This is just the reverse of the principle of ventilating rooms of ordinary temperature, where we require to constantly remove the top layer, and often actually do so when we provide false ceilings to passages, &c.

There is one point about the circulation of air in a set of hot rooms that requires considerable attention, and that is the backflow along the floor. In any bath where hot air is supplied, if the bather will hold his linen "check" across the top of the doorways between the rooms he will find that the air is flowing from the laconicum to the shampooing-room. If, however, the sheet be held across the lower portion of the doorway, he will find that there is a current of air setting in an opposite direction—from the shampooing-room to the laconicum. This is shown at Fig. 6.

It will be seen from the diagram that the bather is really in this back-flow when he is standing between and in a line with the doors of the hot rooms. All the air appears to be travelling along the top of the bath, and the bather reclining on the marble-topped benches would seem to be bathed in air that has passed along the top of bath, round the shampooing-rooms, and back along the floor. In reality, however, it is only from door to door that the currents exist exactly as shown at the diagram, Fig. 6.

This circulation of air will exist in any bath heated on the modern system—that is to say, where freshly-heated air is passed in in sufficient quantity. It is a natural result, and tends to distribute the heat more equally. The back-flow is only objectionable when a door is opened direct from the heated shampooing-rooms to a cooler apartment, as the plunge-bath chamber. The bather standing in a line between the doorways may then feel a cold draught. To guard against this, double doors, with a small lobby between, should be provided to any communication with a cold chamber.

A set of hot rooms could be constructed so that the bather would be in the top current of air that flows from the heating apparatus. By reference to Fig. 6 the reader will understand that by the provision of a platform or grating midway between the floor and ceiling this end would be attained.

The atmosphere of the sudatory must be perfectly free from vapour. "Perfect dryness of the air," says Mr. Urquhart, "is indispensable to the enduring of a high temperature. . . This dryness is further requisite for electrical isolation. With vapour in the chamber an atmosphere is created injurious to health and conducive to disease. It is the very condition in which low, putrid, and typhus fevers flourish. The electrical spark will not ignite in such an atmosphere, and the magnet will lose its attractive power. We all know the difference of our own sensations on a dry and on a damp day."

The heating power of furnaces must be studied. Having calculated the cubical contents of the rooms to be heated, and given the heating power of the stove or apparatus to be employed per cwt. of metal or superficial foot of radiating surface, we arrive at the necessary size. Messrs. Constantine give the following tables to show the heating power of the "convoluted" stove. The figures give the requisite size of stove to raise the air to about the relative

temperatures I have mentioned before, and with ordinary firing.

Weight of metal.	Sq.ft. of heating surface.	Area capable of heating.
14 cwt.	35 sq.ft.	= 500 cub.ft.
20 "	55 "	= 1,200 "
22 "	69 "	= 2,000 "
34 "	119 "	= 3,500 "
36 "	139 "	= 5,000 "
45 "	180 "	= 8,000 "
50 "	231 "	= 12,000 "
56 "	296 "	= 16,000 "

When different kinds of heating apparatus are employed, their heating power must be carefully ascertained and calculations entered into, or it may be found necessary to resort to the costly and humiliating process of dragging out the stove or pulling down the furnace and refitting a larger one. This point is worth attention. Such mistakes are not infrequently made.

As regards the amount of air that should flow through the hot rooms, an allowance of 40 cubic feet per head per minute should be the minimum, if purity of atmosphere is to be maintained.

The allowance of 40 cubic feet per head per minute should not, if properly distributed, cause an unpleasant draught in any part of the hot rooms, as it must be remembered that even in a highly-heated atmosphere a waft of air of the same temperature is felt to be cold. The main thing to be studied in this provision of a large volume of air is that the cold inlet be ample, and the passage from this intake to the point where the air is debouched into the laconicum equally roomy and unobstructed. The rapidity of flow will depend upon the means provided for the extraction of the foul air. With large horizontal flues, and a capacious and tall shaft, the so-called natural system of ventilation will be as effective as could be desired. Greater extraction power is gained if in the brick stack a smoke-pipe can be placed running up the whole height. In many cases mechanical ventilation could be employed with the greatest benefit. A "Black-man" air-propeller fixed at the end of a system of horizontal flues under the floors of the hot rooms, and running so as to exhaust, would do away with all the objectionable odours and nastiness of many baths.

The ventilators placed at the floor level of the hot rooms should be actually so, and not 3 in. or 6 in. above. Long, wide gratings 6 in. deep are preferable to those of deeper and narrower design. In theory, indeed, the whole circumference of the hot rooms should be lined round with gratings, thus making the sudatory like a lidless box inverted, into which hot air is thrown and escapes all round the bottom edges.

Owing to the expansion by heat, a relatively greater volume of air enters the laconicum than the cold intake. This fact, however, does not practically affect the arrangements for ventilation, &c. Theoretically, however, it would seem to demand that the shaft conducting from furnace to hot rooms should be of greater sectional area than that to the furnace from the intake—about one-third larger—and that the total area of outlets for the escape of vitiated air should be about midway between the two.

I had intended to have given plans of methods of ventilating different hot rooms, but have thought it better to devote the space to the elucidation of principles. What I have said on the subject of heating and ventilation should enable anyone to arrange the flues, &c., for any given system of sudatory chambers; and I shall, therefore, in my next article, proceed with the question of water fittings and appliances.

(To be continued.)

The county magistrates of Staffordshire proceeded last week to appoint a county surveyor in the stead of the late Mr. Robert Griffiths. There were recommended by a committee—Mr. Walter Harris Cheadle, of Stafford; Mr. Arden Hardwicke, of Walsall; and Mr. Joseph Lobley, of Hanley. Owing to the unsettled state of administration, owing to the approaching election of the first County Councils, it was decided to appoint Mr. Cheadle to the office for a period of three months only, Mr. H. W. Harley being appointed road surveyor for twelve months at a salary of £360.



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## ILLUSTRATIONS.

THE TIVOLI THEATRE AND RESTAURANT.—THE MONTROSE MEMORIAL.—CHRIST CHURCH, BRONDESBURY.  
—SIR CHRISTOPHER WREN'S DRAWING OF THE NORTH TRANSEPT OF WESTMINSTER ABBEY.—SKETCHES OF OLD WORK.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## THE TIVOLI THEATRE AND RESTAURANT.

THE Tivoli Theatre and Restaurant, now being erected, is situated in the Strand, close to Charing Cross, and has a frontage of about 90ft., the whole of the buildings being of fireproof construction. The elevation is after the style of the old houses in the market-place by the Hôtel de Ville in Brussels, the pilasters in the front being composed of marble and bronze. The entrances to the concert hall are on three sides of the building. The area is entered by a broad staircase, and is provided with three exits. Access to the balcony is gained from the grand entrance hall, and there are two exits. The first balcony is approached by a wide staircase, and also has two exits; the exit accommodation being equal to over 5,000 persons, whereas the actual seating accommodation is calculated at about 1,000, and the promenade, lounges, &c., about the same. On each tier ample space has been set apart for promenade purposes. The staircases throughout are composed of concrete. On each level retiring rooms for both sexes have been provided. A sliding roof forms a portion of the system of ventilation, besides which there are patent self-acting exhausts fitted throughout the buildings. The interior decoration is Indian in style. The platform, or stage, is fireproof, and any wood used is coated with fireproof paint. Sprinklers on the non-automatic system have been placed over the stage, and are controlled by valves fixed near the artistes' door, where is also placed a hydrant, the whole being under the control of the fireman. The whole building is provided with hydrants. The artistes' rooms are well ventilated, and are fitted with every accommodation, the lady artistes being on one side of the stage, and the gentlemen on the other. There are two exits from the stage. The restaurant consists of a buffet on the Strand level, the Palm room on the first floor, the Flemish room on the second floor, and the private dining rooms on the floor above, with the kitchens and offices on the top floor. The restaurant is entered from the corner of the Strand and Durham-street by a marble staircase, while a luxurious lift enables diners to reach every floor without trouble. The floor of the Palm room will consist of tiles of alabaster. The dado, which is panelled, is also of alabaster. The room is divided into sections (so as to partly screen each table) by carved figures representing Cupids driving swans, supporting real palms intermingled with leaves of bronze palms, the latter rising to the ceiling supports, and dividing the wall surface above the dado into panels, which are filled with Venetian mirrors to correspond with the windows. The ceiling is divided by groups of palm leaves, forming pendants, from which hang globes representing the fruit of the palm, the globe carrying the electric light. The colouring will be enamel, white and gold. The room

is about 60ft. long by 28ft. wide. On the second floor, the Flemish room, another large dining room of the same size, is decorated in the old Flemish style with carved oak. The walls and ceilings are panelled in oak and various woods, with tapestry panels and oak beamed ceilings and polished oak floors. The upper part of the room is raised, so as to give a quaint effect, as in an old hall. On the third floor are the private dining rooms, decorated in different styles: Moorish, French, Renaissance, Pompeian, &c. On this floor is also provided a Masonic Temple, decorated in the French Gothic style in panelled oak, with all the necessary ante-rooms. In this room there is an organ fitted in an ante-chamber. Each floor is provided with lavatory accommodation. In the basement there are hairdressing saloons and dressing rooms, and throughout every convenience has been provided, including service lift to each floor besides the passenger lift already mentioned. The electric light will be used throughout the entire buildings, although gas will be laid on in case of emergency. The whole of the restaurant is heated by hot water. Mr. Walter Emden is the architect, Messrs. Kirk and Randall are the contractors. The lifts are by Messrs. Waygood. Mr. Charles Randall, brother to one of the firm, is the manager of the works.

## THE MONTROSE MEMORIAL, EDINBURGH.

WITHIN the past week or so this monument has been unveiled in the cathedral of St. Giles at Edinburgh in memory of the "Great Marquis of Montrose," who was executed on May 21st, 1650. The Clan Graham and their friends have subscribed the money for the erection of this memorial, which cost £1,100. Dr. Rowand Anderson, F.R.I.B.A., was the designer of the work, and Messrs. J. and W. B. Rhind, of St. Helen's, Cambridge-street, Edinburgh, were the sculptors. Their recumbent figure, in white marble, of the marquis in armour, and bearing a bronze sword grasped in his right hands, forms a dignified composition, resting on a black marble bier which rises from its sarcophagus, mounted on a pedestal. The central panel of the frieze of the sarcophagus is thus inscribed:—

"Scatter my ashes, strew them in the air,  
Lord, since thou knowest where all these atoms are;  
I'm hopeful Thou'lt recover once my dust,  
And confident Thou'lt raise me with the just."

The principal feature of the design is a semi-circular arch deeply recessed, and flanked by two Corinthian pillars in black and gold marble, with alabaster bases and caps. The wreaths in the middle of the columns are also of alabaster. These piers carry a frieze, entablature, and cornice, crowned by boys supporting shields over the columns. Floral wreaths and panels enrich the frieze. Rising over the cornice in the middle is a central panel within a columned and pedimented niche, quartered with the full coat of the Graham arms. The arched recess behind the monument proper is divided into three panels formed with alabaster mouldings, with a sculptured inscription in the centre compartment. The width of the composition is 9ft., and the height 16ft. The style chosen is the Renaissance of the 17th century.

## CHRIST CHURCH, BRONDESBURY.

THE greater part of this church, including the tower and spire, was built several years ago. The organ-chamber and vestry to the south of the chancel have lately been added, and the completion of the design by the erection of the south transept and south aisle will soon be called for to meet the requirements of the increasing population of the parish. The walls are faced externally with Kentish rag, having dressings of Box Ground stone. The internal stonework is of Caen stone, Purbeck and Devonshire marbles being used for some of the shafts. The chancel steps are of green porphyritic marble. The walls and ceiling of the chancel are decorated with colour and gilding. The windows contain painted glass. The contractor for the recent works was Mr. Tennant, of Willesden. The earlier portion of the building was erected by Mr. T. Holland, of Kensington. The alabaster reredos was executed by Messrs. Farmer and Brindley, of Lambeth. The cost of the building, including the painted glass, has been about £12,000. The architect is Mr. Charles R. Baker King, A.R.I.B.A., of London.

## WESTMINSTER ABBEY—NORTH TRANSEPT.

THE work of re-casting the front of the north transept of Westminster Abbey is now in progress under the direction of Mr. John L. Pearson, R.A. Sir Gilbert Scott, R.A., rebuilt the great portals. Mr. Pearson's present work seems to be devoted to rebuilding the buttresses and re-casing part of the façade, and we hear that a new design has been made for replacing the great rose window. The close hoarding prevents, however, a proper inspection of the elevation, which is now in an advanced stage. To-day we publish a highly-interesting reproduction of the original drawing, illustrating the restorations to this same front during the 18th century, which work is now being removed. This drawing also correctly shows the façade as it existed before the design of Queen Anne's reign was carried out. It bears the autograph of Sir Christopher Wren, after the words "May 20, 1719. I do approve of this Design." Other signatures enhance the interest of the document, while the autograph of Bishop Thomas Sprat, Dean of Westminster, clearly shows that the design was made several years before Wren gave his official authority for its execution, inasmuch as Dean Sprat died in 1713. William Morice was High Bailiff of Westminster at that time, and for some reason or other he signed the drawing with Mich Evans and Har Barker, of whom we have no particulars. The whole of the then existing elevation is drawn out, as shown by the right-hand side half of our plate, and the new work, as seen by the left-hand half, is represented by a flap fastened on in the usual way to the edge of the sheet, and cut out in profile, so as to permit of the undisturbed part of the older building being seen at a glance. The absolute truthfulness of the drawing, as concerns the old work as it then existed, is confirmed by engravings of the Abbey published at that time, and they all bear witness to the fact that "Solomon's Porch," which in Dean Dolben's days projected from the centre of the front, had been removed previous to the beginning of the 18th century. Hollar's engraving of the Abbey, in which the north transept occurs, gives "Solomon's Porch," which it is said was erected in Richard II.'s reign. The round arches shown at the triforium level in this drawing of Wren's have been questioned by one or two authorities to whom we have submitted it; but Mr. J. E. Gardner has among his unique collection of engravings of Old London a large folio print of the north transept of the Abbey, published about the end of the 17th century, which exactly corresponds in this respect with the drawing here given. This little arcade was, in fact, then but lately added to the front. The houses to the west of the transept and adjoining the north aisle of the nave were, of course, long ago removed. The solid filling up of the space under the arch of the flying buttress, seen in the left-hand half of our plate, was omitted in execution, as no traces of it appear in any of the delineations of this part of the church. At the time Sir Christopher Wren signed this drawing he was living at Hampton Court, where he had a house on lease from the Government. In 1718, in the 86th year of his age, and 49th of his office as Surveyor-General to the Royal Buildings, the great architect was ignominiously dismissed, and that "young and supple quack," Benson, who was extolled as a second Palladio, was installed in his stead. Pope's couplet lends lasting expression to the general disgust then felt at this proceeding:—

"Benson, sole judge of architecture sit,  
And namby-pamby be preferred to wit."

Wren, thus disgraced, found his chief pleasure in coming up to Westminster to inspect the repairs in progress at the Abbey; and he then directed the erection of the western towers, which are a curious mixture of mingled Grecian and Gothic detail. His death was due to a cold caught on one of his excursions to Westminster in 1723, four years after he signed this drawing now published. The sheet must be taken in connection with his report on the Abbey, written for the Dean in 1713, and the work here shown is therein correctly described. The casing of the exterior of the church was going on for something like half a century, and was begun some time before the date of Wren's report, which was professedly written on account of his great age



and for the guidance of his successors. The north transept was not then reached, and it is very likely that the date on the drawing, 1719, is that of the beginning of the work upon it. During the latter half of the 17th century some considerable alterations had been made, and in the place of "Solomon's Porch" the ugly ogee pediment was put over the west door, while the "little Doric passage," as Wren calls it, was patched on. This last feature is very well represented in the right-hand half of our plate, and accounts for the round arches already referred to. The drawing, of which we have been able thus to-day to present our readers with a facsimile, belongs to Messrs. Lee Bros. and Pain, architects, and it forms one of a series, also their property, of about the same date, showing chiefly this same part of the Abbey. Some of the sheets are signed by "W. D. 1722," who was William Dickinson, surveyor to the Abbey. Sir Christopher Wren acted more as consulting architect. A very careful elevation in outline to a larger scale shows the front as finished, and gives a design for a square central tower to the church. The drawing we have copied is set out to about  $\frac{1}{16}$ th scale. A large scale detail for a big rose window is also among the same collection.

The following illustrations of Westminster Abbey have appeared in the pages of the BUILDING NEWS:—Grand plans, July 2, 1869, and May 16, 1884; do. of conventual buildings (by late Rev. Mackenzie E. O. Walcott), May 31, 1872, and March 3, 1876; do. of St. Katherine's Chapel, June 28, 1872; do. of apse (by late G. E. Street), May 30, 1879. Ancient views by Braun (1572) and Faithorne (1658), June 28, 1878; west front, Jan. 15, 1886; north transept exterior (H. A. Gribble—Sketchbook series, No. 17), Feb. 4, 1870; north porch (Sir G. G. Scott's restoration), May 8, 1878; east end of choir, Jan. 22, 1886; choir from apsidal chapel (R. J. Johnson), April 17, 1886; bay of choir (Sydney Vacher), Jan. 15, 1877; St. Edward's Shrine in the 14th century (T. H. Longfield), Sept. 10, 1875; Islip's Chapel (A. Needham Wilson), May 30, 1884; restoration of Henry III.'s tomb (T. H. Longfield), April 1, 1887; tomb of Aylmer de Valence (H. G. W. Drinkwater), Aug. 22, 1873 (do. by T. Miller), Feb. 6, 1880; iron grille, Queen Eleanor's tomb (T. F. Pennington), Aug. 8, 1879; gates of Henry VII.'s chapel (G. E. T. Lawrence), April 20, 1885; panel in Henry VII.'s chapel (L. J. Phillips), July 30, 1880; bay of south transept and triforium carvings (J. Atwood Slater), Jan. 12 and 19, 1883; do. upper arcade (Jas. Hicks, — Sketchbook series, No. 14), Jan. 14, 1870; pulpit (Sir G. G. Scott's new), Sept. 12, 1862; memorial brasses (to Sir Gilbert Scott), Sept. 12, 1879 (to G. E. Street), Oct. 10, 1884; carved dragon from a tomb, Jan. 15, 1885; cloisters, north walk of (W. H. Lockwood), April 12, 1872 (do. by T. McLaren), Feb. 15, 1884; do. lavatories in south wall (A. Needham Wilson), April 3, 1885; chapter-house entrance (M. Allen), Jan. 27, 1881; do. panel in doorway (T. F. Pennington), July 23, 1870; proposed Campo Santo (Sir G. G. Scott's design), Feb. 29, 1884.

### CHIPS.

The foundation stone of a new Conservative Club was laid at Bramley, near Leeds, on Saturday. The building, which is being erected from designs by Mr. Thomas Wain, of Leeds, will occupy a site at the junction of Moorfields-road with Bramley Town-street, and will cost £3,000.

Mr. J. Henry Middleton, F.R.I.B.A., Slade Professor of Fine Art at Cambridge, has announced a course of lectures for the present Term on "Medieval Art in England as applied to Domestic Purposes."

The Metropolitan Board of Works decided at their meeting on Friday to seek Parliamentary powers next session for carrying out two street improvements—the widening of Mare-street, Hackney, from the North London Station to Paragon-road, estimated to cost £167,000; and the widening of Kensington High-street, estimated to cost £169,500.

A fire occurred on Sunday on the premises of Mr. W. H. Hardy, timber merchant and packing-case maker, Parkinson-street, Nottingham. The building in which the fire originated was destroyed, and damage was done to the adjoining engineering works of Mr. H. Savage, and to Messrs. Ashworth, Kirk, and Co.'s sawing and planing mill. The total loss is considerable.

The City Corporation will seek next session Parliamentary powers to purchase additional property abutting upon the southern approach to the Tower Bridge, and for an extension of time of four years for completing the bridge.

The statue to Sir Hugh Owen, which has been erected at Carnarvon, was unveiled on Monday by Lord Aberdare. Mr. Milo Griffith was the sculptor, and Messrs. Hugh Jones and Co. supplied the pedestal, which has been erected under the supervision of Mr. R. Lloyd Jones, the borough surveyor of Carnarvon.

A new Constitutional Club is about to be built at Sevenoaks, from plans prepared by Mr. T. Potter, of that town.

### ARCHITECTURAL ASSOCIATION.

ON Friday evening the forty-seventh annual session of the Architectural Association was inaugurated by the delivery of an address by the incoming President, Mr. Herbert D. Appleton, F.R.I.B.A., and the distribution of the prizes gained during the last year of class work. Sixty-eight nominations for membership were read, and Mr. Hippolyte J. Blanc, of Edinburgh, who had signified his willingness to join the Association, was elected unanimously and by acclamation. The adoption of the annual report (summarised in our last issue, p. 501) and balance-sheet was moved by Mr. Cole A. Adams, a past president, who, while congratulating the members on the continued progress and prosperity of the Association, expressed his regret that the lists of class members were so meagre when contrasted with the increasingly lengthy roll of members. The motion was seconded by Mr. S. Flint Clarkson, another past-president, supported by Mr. Bulmer Booth, and unanimously agreed to. The prizes were then presented to the successful students of last session by the President, the prizemen appearing in person in almost every case, in marked contrast to the sparse attendance of the winners of awards at a similar ceremony at the Institute meeting in the same room in May last. Among the exceptions to the rule of personal attendance was Mr. D. J. Blow, the winner of the Association Studentship and the first prize in the Class of Design, who is at present with Mr. Ruskin in Venice. We gave a full list of the prize winners a fortnight since, p. 491.

### THE INAUGURAL ADDRESS.

was then delivered by the PRESIDENT. He remarked that while it could not be denied that the association had become in reality the "college of architecture," affording the best preparation for the candidates for the Institute obligatory examination, there were, in his opinion, other subjects besides the examination which claimed their attention, and he proposed to consider one or two suggestions for increasing the scope of their work. With the present method of carrying on the work by means of honorary instructors could still be included many studies not at present taken up; but the system had very definite limits and possibilities. The time had now come, he believed, when a new departure should be made in the work of the Architectural Association, by the organisation of a division for the study of modern design. They had in the classes excellent opportunities for studying the classical or archaeological side of the art; but the modern side was only treated in the class of design, whose members were a younger set of men than used to form the class say ten or fifteen years ago, and he feared it would be difficult to make the class work if any large influx of older men joined. It should be impossible to ignore altogether in the working of the Association the influence that contemporary work had on modern design. As far as the prize list was concerned, the Association offered no encouragement for the study of contemporary design; but rigidly drew the line at the 18th century. No prize had ever been offered by the Association for the study of any building of a later period. In this, he thought, the Association was quite right, and that it would be a mistake to substitute the study of modern instances for the study of old examples. A careful training in the purer styles of Classic and Gothic might be undertaken in order to train the eye to their just proportions, and to appreciate the beauty and appropriateness of their mouldings and features, and this could only be satisfactorily done by carefully measuring, plotting, and sketching the actual examples of old work. The President continued: We cannot shut our eyes to the fact that the precedents for design are sought in contemporary work, and the practice is on the increase, owing in a great measure to the number of illustrations that are published. This being so, it became a question whether we should not honestly admit the fact, and do our best to train our powers of analysis and criticism so that the selection shall at least be of the best examples. It would not be difficult with many a modern design by our best architects to produce the old examples on which they were based. A careful comparison of the original with the translation would show how much the

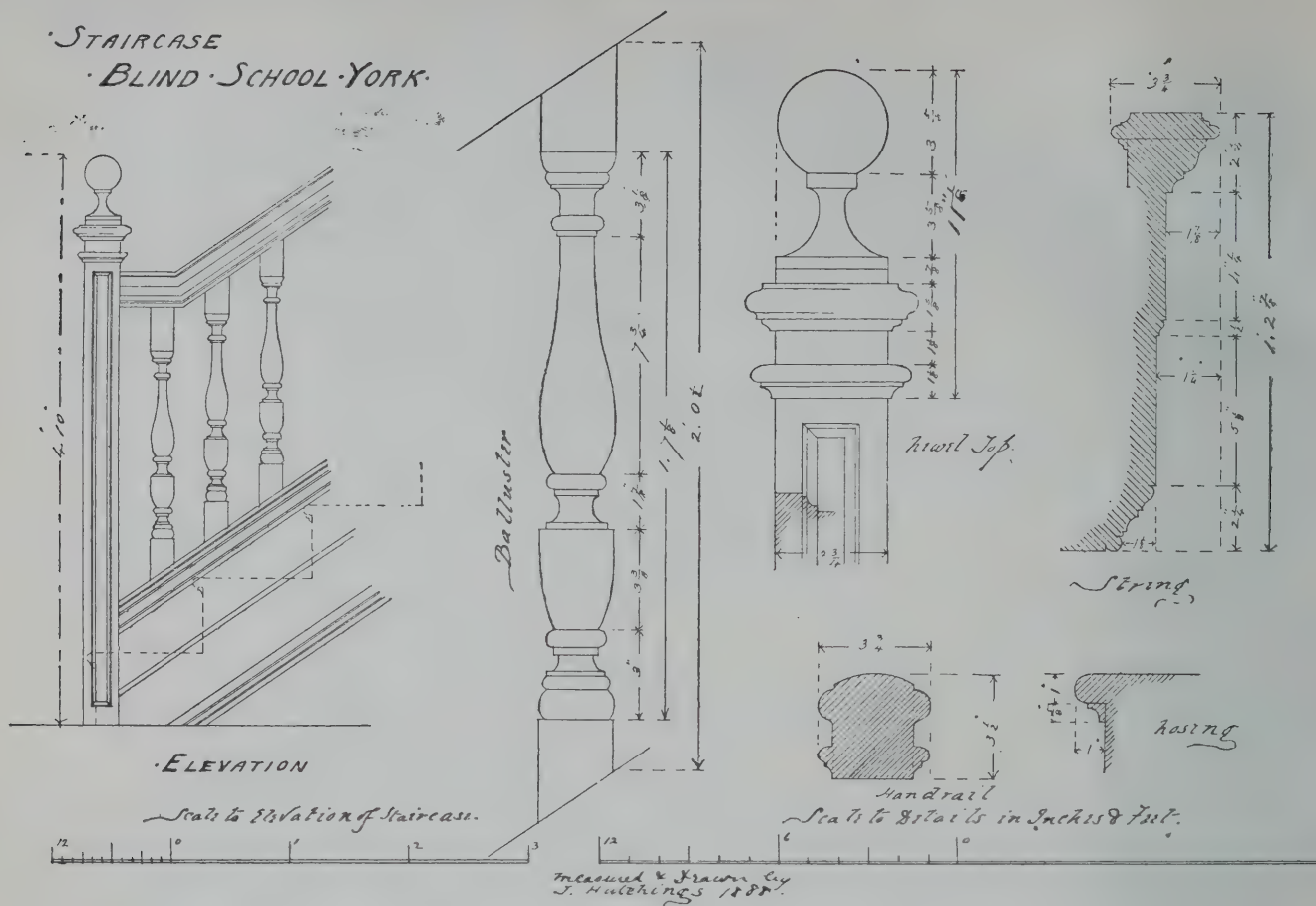
master mind had used of the original, and how much was his own, and the process of analysis could go further—the translation might be from an original stone or brick treatment into terra-cotta—and to trace how the master had handled the detail so as to suit the new material, and stamp at the same time his own personality on the work—would demonstrate how the 19th-century requirements were made to modify the original expression. It might be a useful exercise for us to take the old example and try our 'prentice hands at a similar translation, when the experience gained by the study of how a master workman had handled the subject before us would be of greater use in our own attempt. What we want is a careful training in analysis, so that we can learn to know what is good and what is bad in modern design. But this power of discrimination can only be the result of careful training, and students should not attempt to study modern work until they have gone through a proper elementary course in the purer styles. It is in order to settle the proper position which the study of contemporary work should occupy in the education of our young practitioners that I venture to make the following suggestions—namely, to form a Modern side in the Association which shall be for those members who have passed through the present more or less archaeological studies; and the first step that should be taken for the formation of this should be the institution of a common room, open every evening, where all the members might come in contact—the young students using it for a waiting room till their classes were held, and the men of the modern division for those interchanges of views on professional topics commonly called "talking shop." It should be with a view of talking shop that they should congregate. Without having any formal papers read or forms of discussion, certain evenings a month might be set apart for talking over subjects previously agreed upon, such as, for instance, one evening a month might be devoted to discussing the illustrations published in the professional press. In connection with this modern division, we ought to have an annual exhibition of illustrations of buildings actually erected, not only in the United Kingdom but all over the world. This would not be difficult if photographs had a prominent position; but these photographs should be accompanied in all cases by sufficient working drawings to thoroughly explain the principles of design in the buildings. With regard to the work of the Association classes, some slight alterations have been made in the elementary classes of design which were suggested in the class reports, and which, it is hoped, will improve and increase the benefits, already very great, which are to be derived from these classes. No alteration will be made in the class of design, the result of the working of last session being considered satisfactory. But during the present session an attempt will be made to improve the working of those classes in which paper work is submitted. Among the fresh facilities for study, it has been found desirable to start this year a class for the study of natural philosophy, which will form an introductory course to the class of graphic statics. The new course of lectures on geology has a very close connection with the science of building, and will be of practical value to all. The President concluded with a few good words of advice to those students about to work in the classes.

Mr. ASTON WEBB, past president, proposed a vote of thanks to Mr. Appleton.

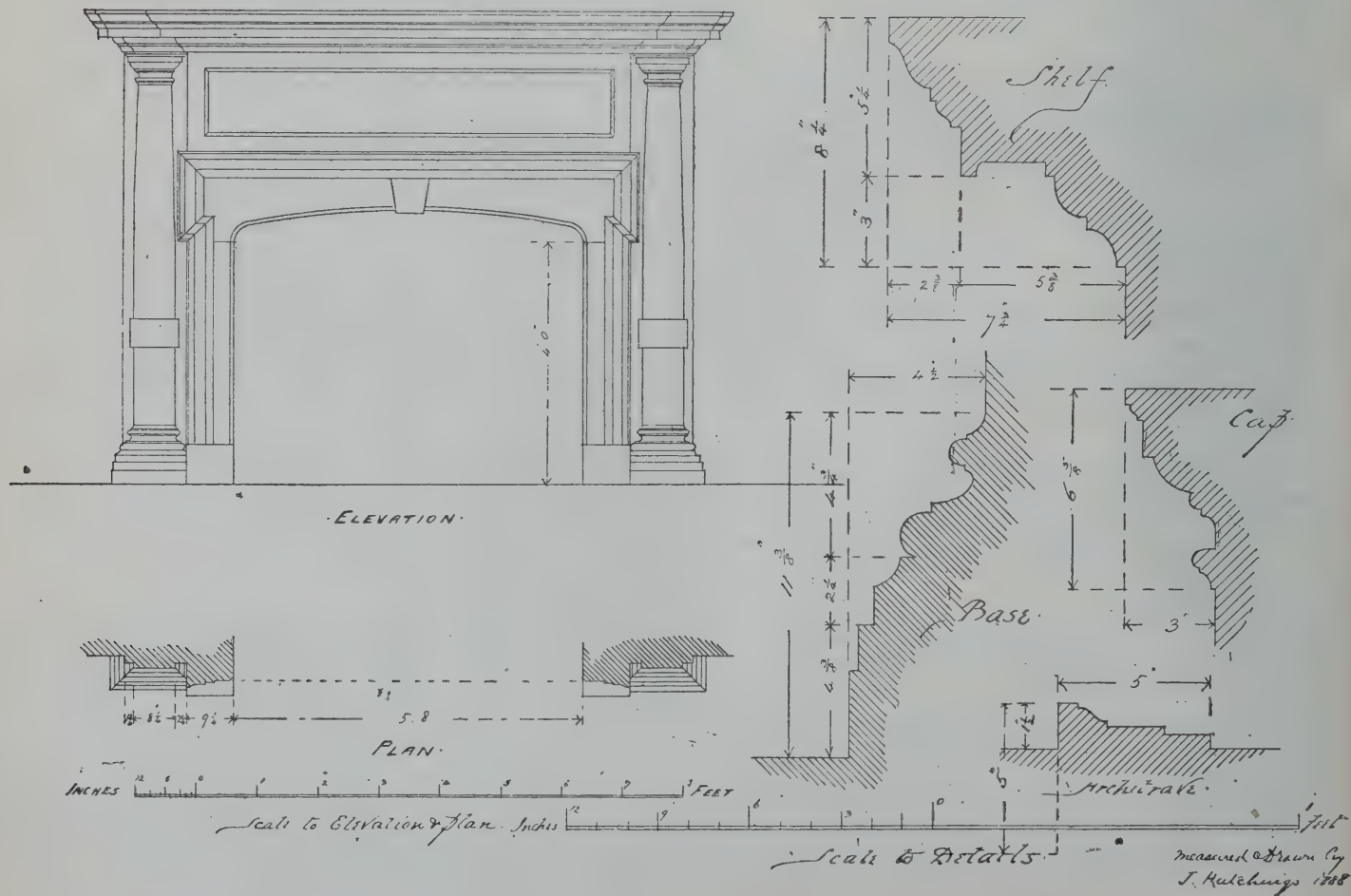
Mr. JOHN SLATER, the retiring president, seconded it, and the motion was carried by acclamation.

A very large clock and set of carillon machinery has just been erected at the new church, Peel, Isle of Man, by John Smith and Sons, Midland Clock Works, Derby. The Cambridge quarters are chimed upon four bells, the hours struck upon the largest bell, and the carillon machine plays seven tunes upon eight bells, one tune for each day of the week. The clock has been carried out by the makers to the designs of Lord Grimthorpe. It has a double three-legged gravity escapement and compensated pendulum. All the wheels are of gun-metal, with their teeth cut from the solid. Special apparatus is provided to keep the clock going while the weights are wound up; the weights are carried by steel wire ropes.





MANTLE-PIECE - MERCHANTS HALL - FOSSGATE - YORK.









THE BUILDING DEWS, OCT, 26, 1888.

NORTH TRANSEPT · WESTMINSTER · ABBEY

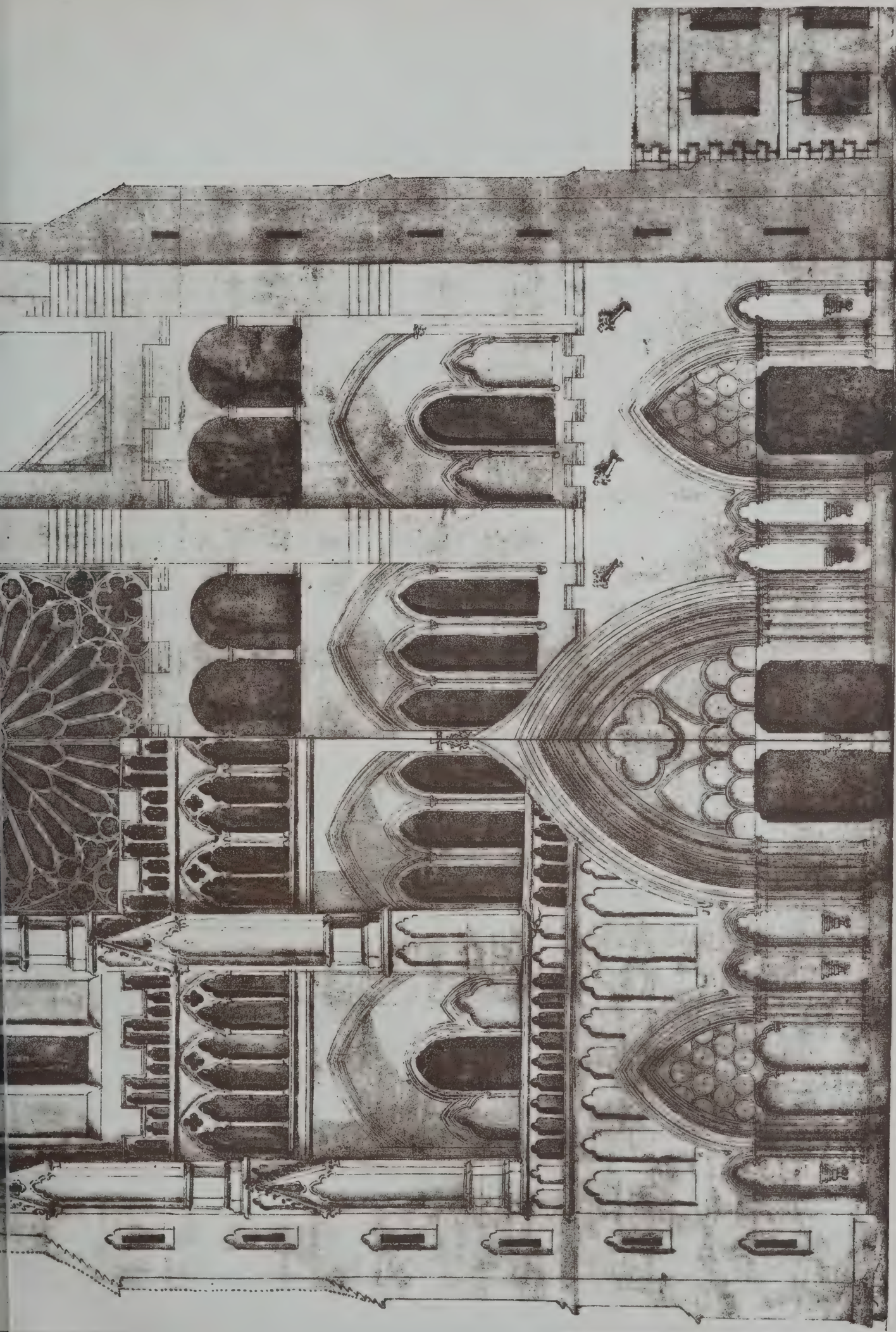
ORIGINAL DRAWINGS · SIGNED · BY · SIR · CHRISTOPHER · WREN · 1719

May 20. 1719.  
A dove's burrow of this Design.  
C<sup>r</sup>. Wren Mich. Evans.

Wm. Spence  
Jas. Parker  
— Wm. Marice







HALF · ELEVATION · SHEWING · WORKS · THEN · CARRIED

HALF · ELEVATION · OF · THE · FRONT  
"PHOTO-TINT" by James Akerman, 6 Queen Square, London W.C.



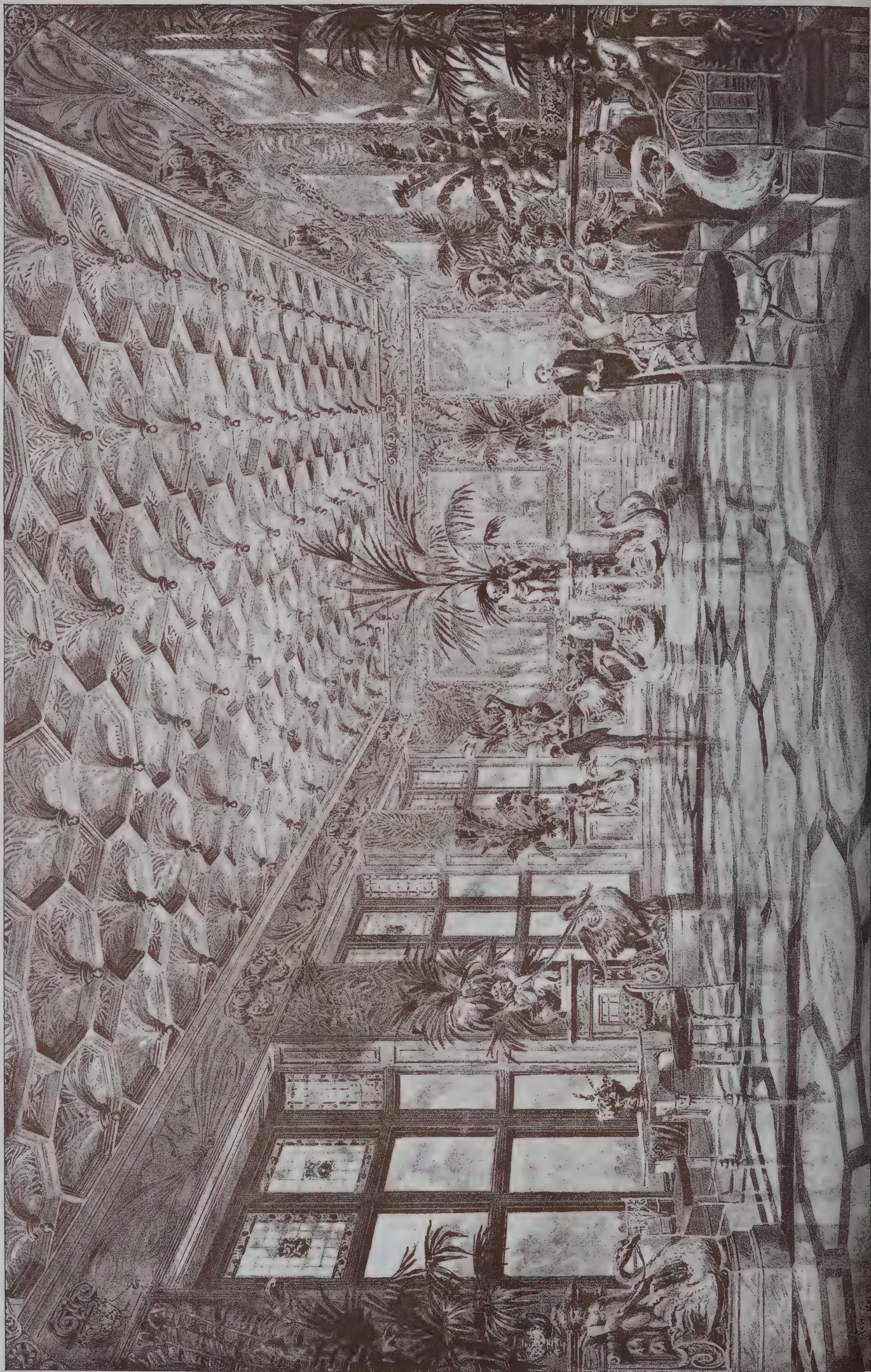








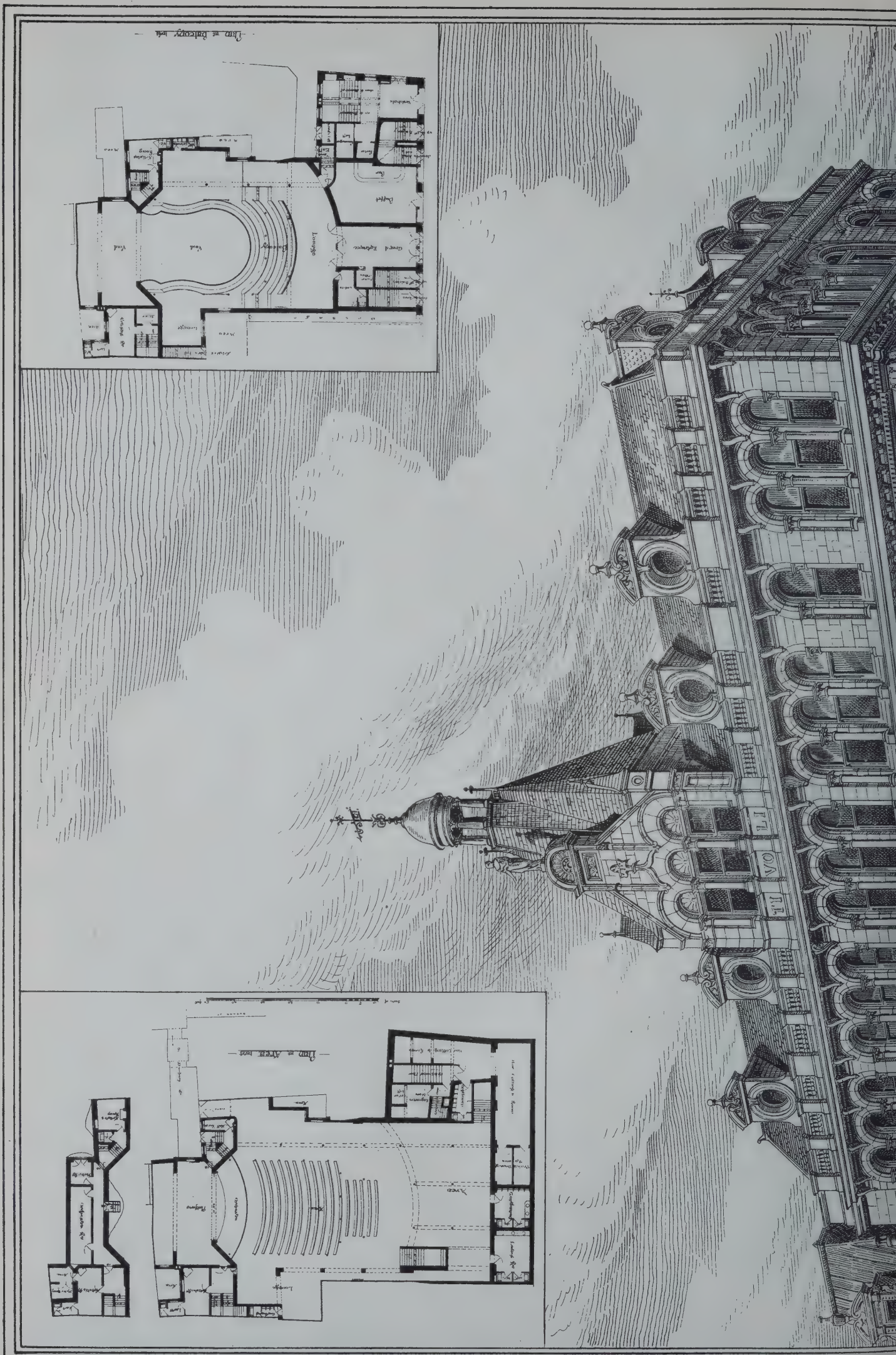
THE BUILDING NEWS, OCT. 26, 1888.













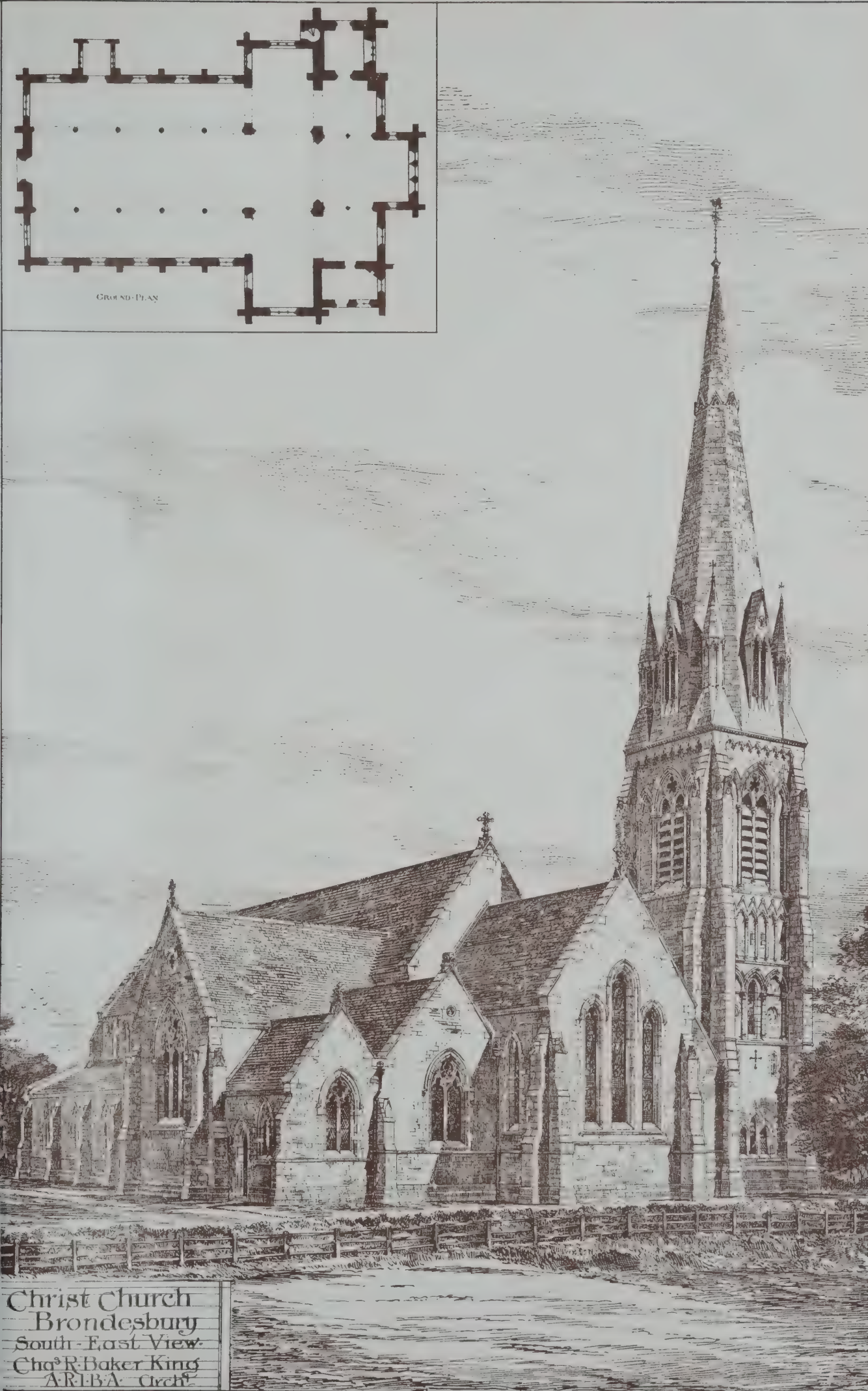
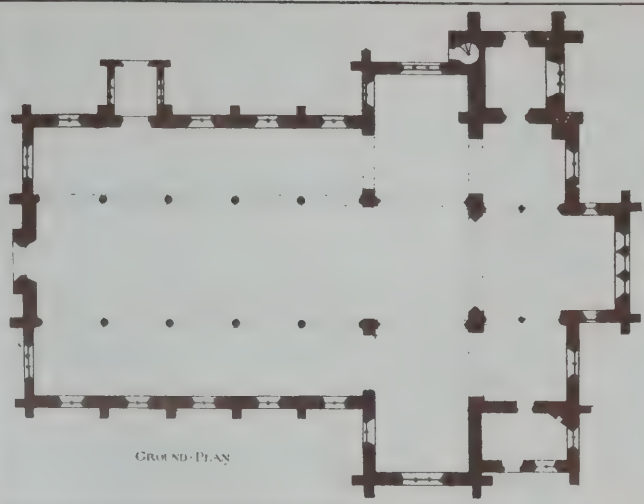


THE "TIVOLI" STRAND : THEATRE AND RESTAURANT : WALTER EMDEN, Architect









Christ Church  
Brondesbury  
South-East View  
Chas R. Baker King  
A.R.B.A. Archt



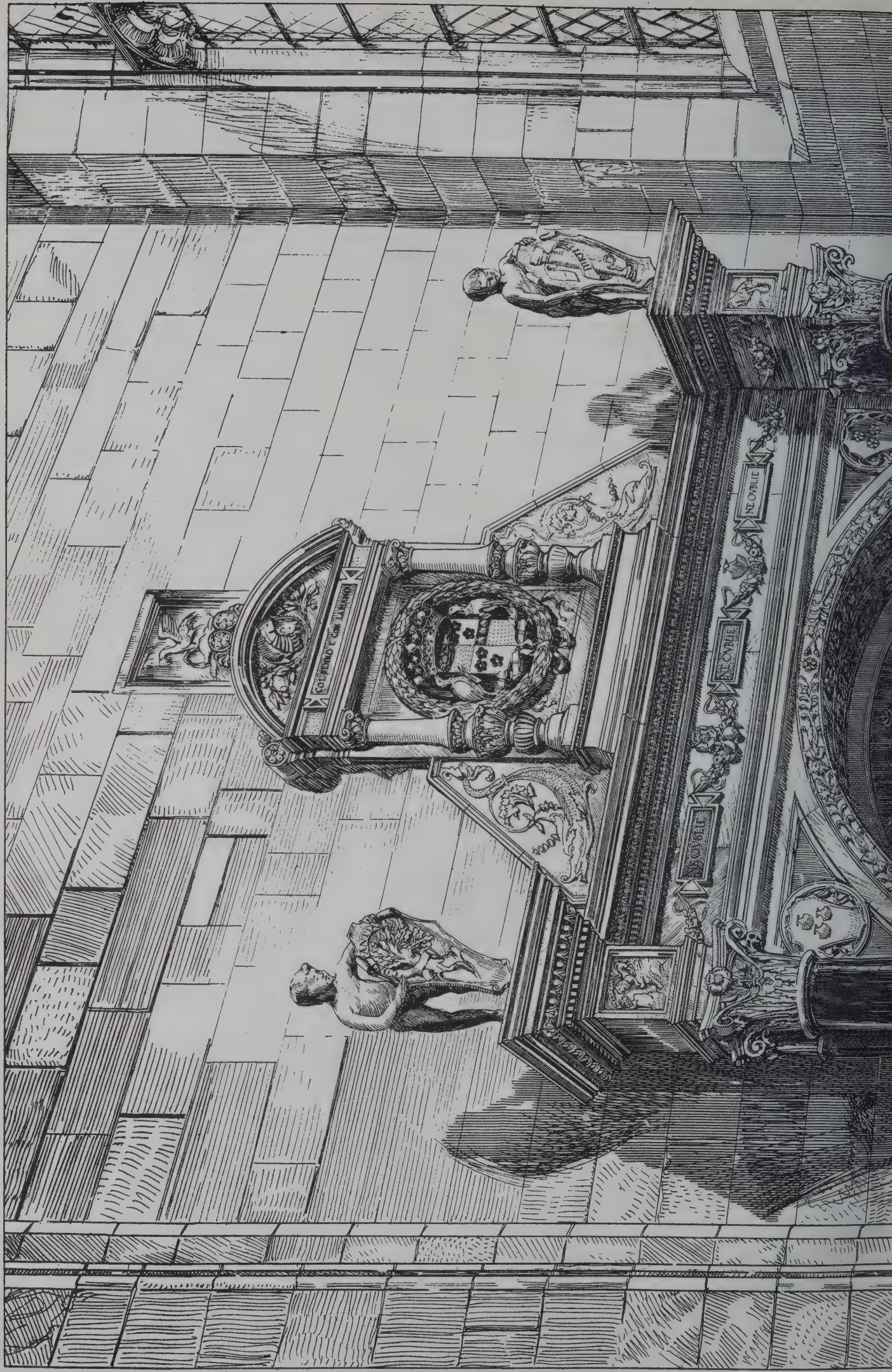








THE BUILDING DEWS, OCT. 26, 1888.





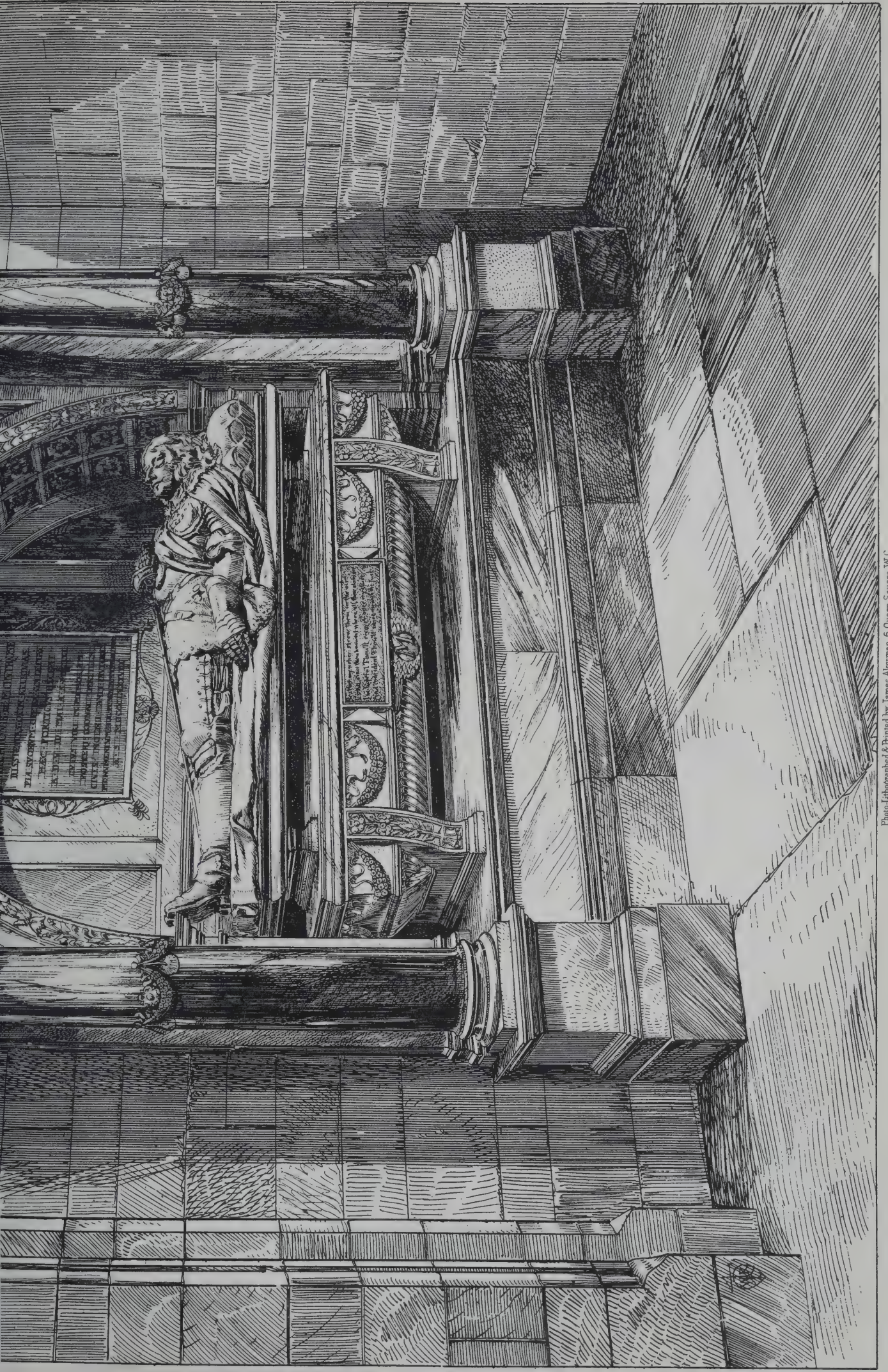


Photo Engraved & Printed by James Aherman, 6, Queen Square, W.C.

A. Rowand Anderson, L.L.D., Archt.

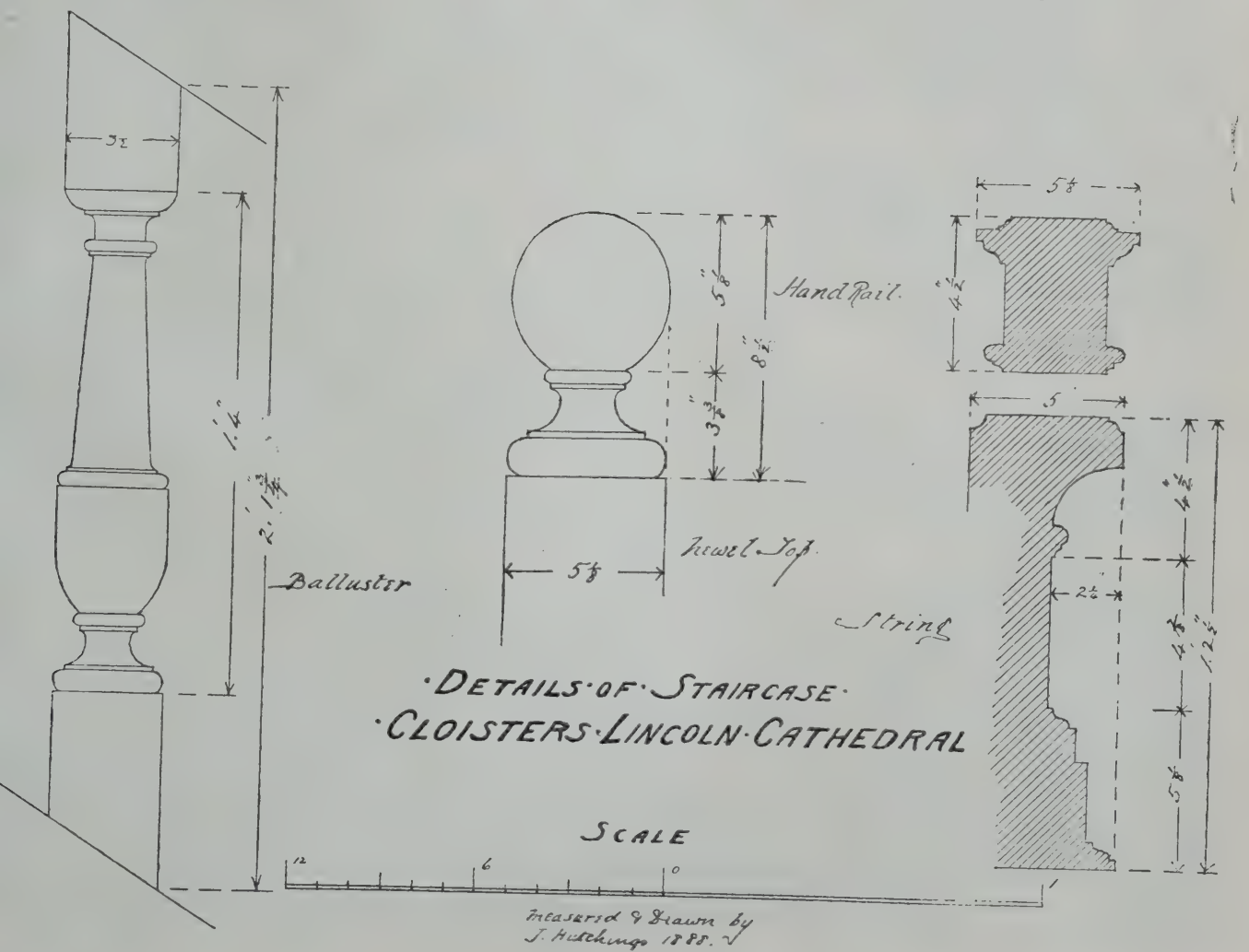
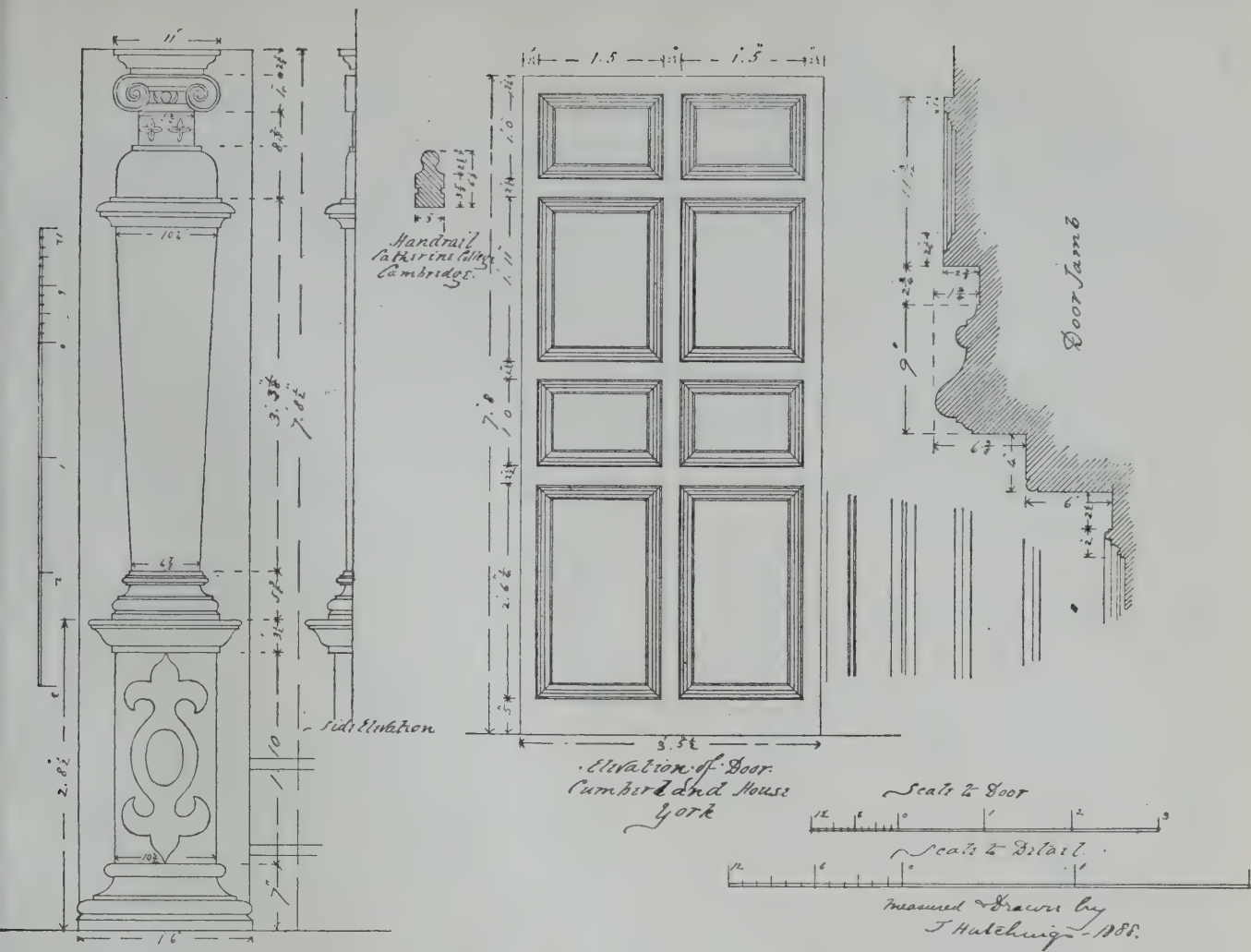
John & W.B. Rhind, Sculpt.

# THE MONTROSE MEMORIAL











## WAYSIDE NOTES.

**C**OMPETING architects are complaining of a lack of work; at least, the exporting gentleman is slack, and has to face the disappointment of the Copenhagen competition being confined to Danish architects. I am sorry that this has not been an international, as it seemed such a liberally-arranged affair. There is little at present to compensate for the loss. Sculptors have a competition before them for the Wallace and Bruce memorial, though it is nothing to create a covetous desire in the heart of the architect. No envy either will be felt on account of the job put in the way of the landscape gardeners by the Penzance Town Council, who offered premiums of £20 and £10, and who levy blackmail to the extent of £1 sterling per competitor. The most welcome feature in the competition world is the new departure of the Council of the Society of Architects, in offering premiums for papers to be read before the Society, which venture should stimulate the literary endeavours of those who would become authors of architectural essays, either theoretical or practical, the latter for preference as being more likely to benefit the Society, the profession, and the essayist himself.

It is reported that the Right Rev. Dr. Bousfield, the Bishop of Pretoria, has returned to South Africa from the Lambeth Conference, taking with him certain plans for a future cathedral church prepared by Mr. William White, of Wimpole-street, W. All that is at present contemplated is the extension of the present existing temporary building by the addition to it of two or three bays of the new cathedral, the old portion forming the choir for the time being. The building will be chiefly of brick, but with stone columns, caps, and bases. The fact that it is proposed to roof the cathedral of St. Alban's with sheet iron does not give one a good impression of the ultimate effect of the work as a piece of architecture. In the report of this departure of the Bishop of Pretoria, I see it stated that the plan is "cuneiform." For the moment I quite thought something really remarkable had been at last achieved by an architect in the way of original planning; but on reflection one sees that the printer's error is the most natural in the world, unless the "copy" was above the average in point of clearness and legibility.

Lord Grimthorpe at it again! At the opening of St. Alban's Hospital, a few days ago, we had another outburst of sweet sayings. Among them I find one which may be placed among the choice sentences highly eligible for copy-books for the infant architect. Quoth his Lordship, "Some architects are worse than others; but none better." What a curious thing! Logic is here set at naught.

Let A = the bad architect  
 " B = the worse  
 " C = the "worse" "

Lord Grimthorpe's position is that B and C may be more depraved than A, yet A is not less demoralised than C and B! The absurdity is sufficiently manifest without logical argument. In addition to this, his Lordship delivered himself of much other abuse in the usual strain, which fell upon his audience like water on a duck's back.

Some time ago I alluded to the apparent enormous activity in "restoring" churches in Devonshire. Last week, having to visit the valley of the Teign, I endeavoured, during the days I had in the West Country, to ascertain whether much havoc had been wrought in that part of the country during Jubilee year. The restorer has certainly been busy in South Devon, though I could not find anything especially objectionable. It was rather the other way; as if it be *desirable* to replace crumbling masonry with new, there is certainly a good deal in that district of Devonshire, from the west front of Exeter Cathedral to the most insignificant of village churches. Much of the external architecture of the cathedral is in a glorious state of decay, and is a soothing spectacle when one feels irritated by what one is tempted to call, with Wren, a condemned "box of whistles" that blocks up the view

without giving any compensating air of mystery to the interior.

Whilst at Heathfield I took the opportunity to inspect Messrs. Candy and Co.'s brick and tile works, which in the ten years they have been established seem to have grown enormously. A useful innovation has just been made there. The excavations whence the fire-clay and vitreous clay is extracted are a hundred yards or so from the grinding mills. On the principle of the endless cables that, fitted with projecting knobs, haul up the toboggans on the slides, a little tramway has been rigged up from the quarry to the mill. A further labour-saving appliance seemed to me excellent. Once run to the foot of the incline, the cars loaded with clay are hauled by the cable to the top, within a few yards of the grinding mill, with its immense and ponderous iron wheels, and then the line dips, and away runs the car or truck, empties itself into the mill, runs back by another line, and is caught up by a knob on the descending chain, and let down to the quarry again by the down line.

I cannot refrain from alluding to the glories of Dartmoor on a fine October afternoon. By tramping from Heathfield to Hay Tor, last Saturday, through quaint old Bovey Tracey with its pretty white-stone church and thatched cottages of true Devonian type, I arrived on the edge of the wild-looking Moor. Amongst the indescribably grand outlooks of this country, one must dot this view from Hay Tor a first place. Widely different are the prospects down the Teign Valley and over the moor: the one lovely, when the afternoon sun shines down upon the hill-tops, and shows us every spire and tower in the villages below; the other impressively grand. Standing on the huge mass of granite, and looking westwards in the face of the setting sun, one sees ridge upon ridge of bleak moorland stretching away as far as the eye can reach. Without the various Tors, however, the view would lack much of its impressiveness, as these grey masses crowning almost every hill, appear like ruins of the handiwork of man, rather than the direct creation of Nature. Taken as subjects for a picture, they afford an extraordinary variety of colouring. The beauty of the grey on the granite is quite extraordinary, and the green of the grass that grows round the stone is a delightful colour one does not ordinarily meet with; while the very sheep that seek shelter behind the vast boulders do not seem to have coats of the ordinary tint. GOTH.

## "BUILDING NEWS" DESIGNING CLUB.

AWARD OF PRIZES, 1887-1888.

**T**HE following is the award of prizes determined by the number of marks obtained by the competitors:—"Ghost" was seven times first and once third, equal to 73 marks. "Boreas" was second five times and third once, equal to 33. "Uncouth Swain" was once first, twice second, and thrice third, equal to 28. "Huz" was first once and second once, equal to 16. The other competitors who obtained ten marks each are "Hercules," "Beatific Microcosm," "Spare Time Well Spent," and "Sketches by Boz." Six marks were won by "A" in a circle, "Solus," and "St. Hugh"; while three marks were obtained by "Economy," "Northumberland," "Bee," and "Netsuke"; "Use" won nine marks.

The author of drawings marked "Ghost" is Mr. C. S. Spooner, 2, Girdler's-road, Brook-green, W., 1st prize, £10 10s. The author of drawings marked "Boreas" is Mr. G. M. Ford, 1, Vanbrugh-place, Leith, 2nd prize, £5 5s. The author of drawings marked "Uncouth Swain" is Mr. H. Baker, 44, Palace-grove, Bromley, Kent, 3rd prize, £3 3s. "Huz" obtains honourable mention, and proves to be Mr. T. H. Cook, 12, St. George's-crescent, Liverpool.

The memorial stone of the fine new Broomknoll Free Church at Airdrie was laid on Friday. The church is being built in the Decorated style. On the ground floor is a hall to accommodate 300, and a lesser hall seated for 90, together with vestry, teachers' room, &c. The church proper is placed over the hall floor, and will accommodate 680 sitters. The estimated cost of the erection is £2,400. Mr. James Davidson is the architect.

## SKETCHES OF OLD WORK.

**T**HE Arcading, Fountains Abbey, to which the illustration refers, is in the north transept, and is Early English work. The abbey, so eminently picturesque, and surrounded by some most beautiful scenery, was founded by a company of monks (under the patronage of Archbishop Thurstun), who in the Benedictine Monastery of St. Mary at York, owing to the lax state of discipline and the prevailing immorality of that seminary.

St. Mary's Church, Castlegate, York, is a mixed style. The nave arches and piers go back to the beginning of the Early English period; there are traces of Norman, but the windows, which seem to have no connection whatever with each other, being most irregular regards size, shape, and position, are some of Perpendicular, several of Decorated, and one lancet of Early English date. Some of the arches are more or less acutely pointed, and some are square-headed. The Sedilia (Perpendicular in style) illustrated are in the north side of the chancel. The base of the tower is square, supporting one of the octagon form, from which springs the spire, the whole exceeding in height 150ft. The church was restored in 1869 and 1870.

The Present School for the Blind, or Manly House, at York, belonged originally to the Benedictine Monastery of St. Mary, as the residence of the Abbot. It subsequently became the official residence of the President of the Council of the North, and was called the King's Manor. Later on the house was occupied by several distinguished men. In style it is Elizabethan (very early), and is constructed partly of stone and partly of brick. It is a great favourite with artists, for parts are exceedingly quaint and picturesque. The staircase illustrated is in the front block, and is accessible from the outside by a richly carved doorway characteristic of the style.

The old Merchants' Hall of York is in Foss gate, and is approached through an archway (adorned above by a sculptured coat of arms) and a courtyard in which a flight of steps leads to the two chief rooms about 65ft. by 25ft. The Mantelpiece illustrated being at the end of one of them. The chapel, which is exceedingly interesting, is only accessible by descending by a step-ladder through a trap-door in the other room. It was built at the beginning of the 15th century, but has been repaired since, and most of the fittings appear to be of Elizabethan date, which is also the style of the room above.

Cumberland House (a door of which is represented), situated near the Ouse Bridge, and facing the river, is an old city mansion. It was built by William Cornwall, alderman of the City, and twice Lord Mayor (in 1712 and 1725).

The Staircase from Lincoln Cathedral is situated in the north-west corner of the cloisters, and communicates with the library alone. Both library and staircase are the work of Sir Christopher Wren. The piece of carving from Catherine College, Cambridge, is on a porch round which winds a staircase in an old part of the college. The two Doors at the same college are on the same landing as the above carving. They are in style Elizabethan.

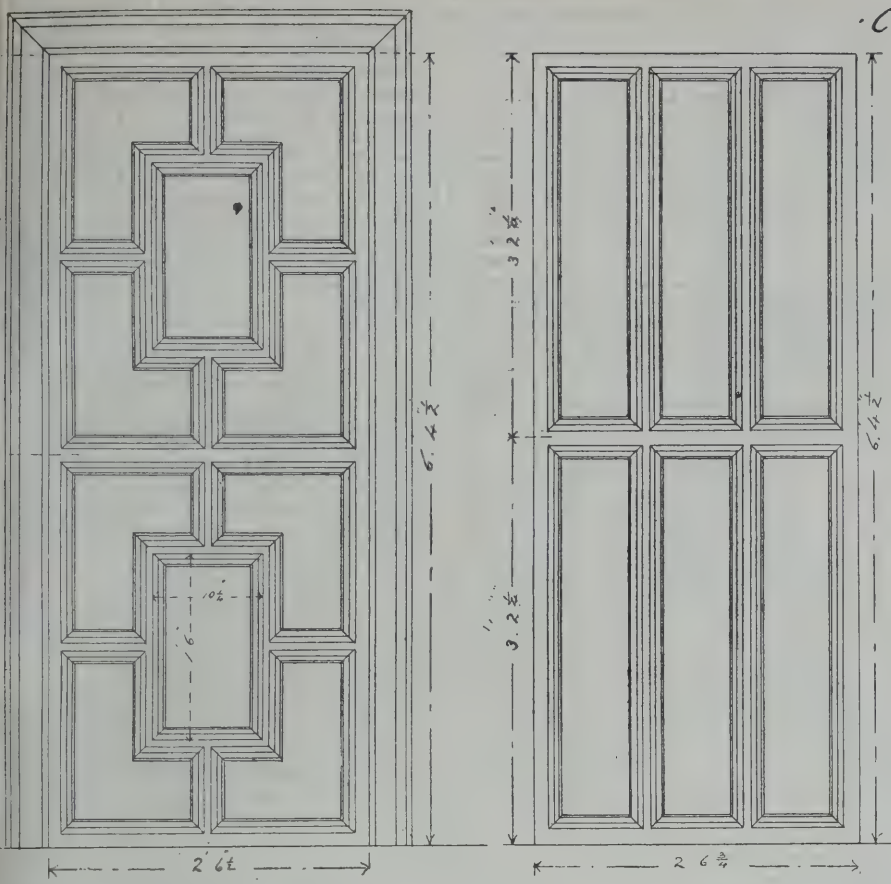
The Balluster, Trinity College, is from one of several similar staircases in that building. It is of rather later date than the last-mentioned.

The details of the staircase leading to the library at St. John's College are Elizabethan. There are near this staircase two doorways with richly carved canopies, very good examples of the same style. J. HUTCHINGS.

For the vacant office of surveyor to the Department of Local Board 154 candidates presented themselves, and a committee have selected from among them six for a final choice.

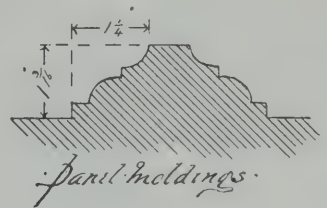
New Board schools at Glanadda, Bangor, were opened on Saturday. They are erected of local stone, Anglesey limestone being used for dressing. There are two schoolrooms and one classroom, and accommodation is provided for 191 infants. The floors are wood block, laid by Messrs. Elliot, Edmondson, and Olney, of Manchester. The grates are the patent Manchester grates, supplied by Mr. E. H. Shorland, Manchester, admitting fresh warmed air into the rooms. The contract was carried out by Mr. Evan Williams, Garth, Bangor, for £1,800, the cost of the site being £250. The architect was Mr. Richard Davies, Bangor.



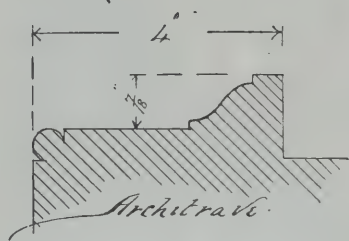


ELEVATION OF DOORS.

CATHERINE COLLEGE.  
CAMBRIDGE.

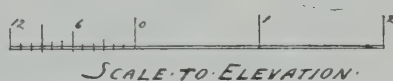


Panel Molding.



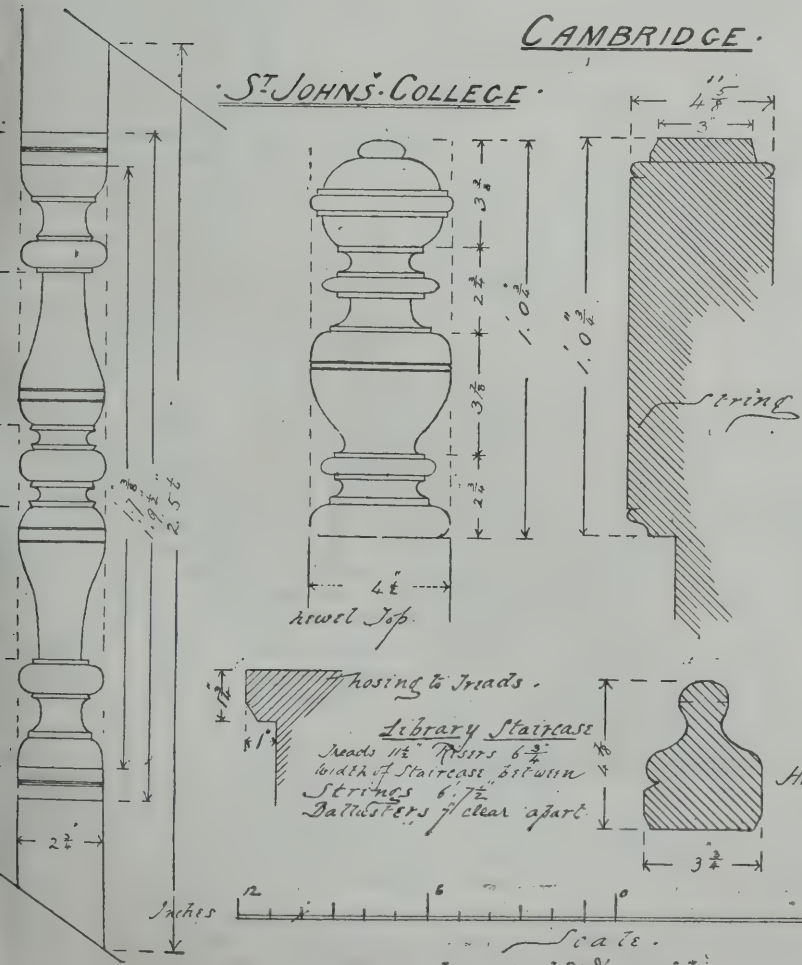
Architrave.

Details 1/2 full Size



SCALE TO ELEVATION.

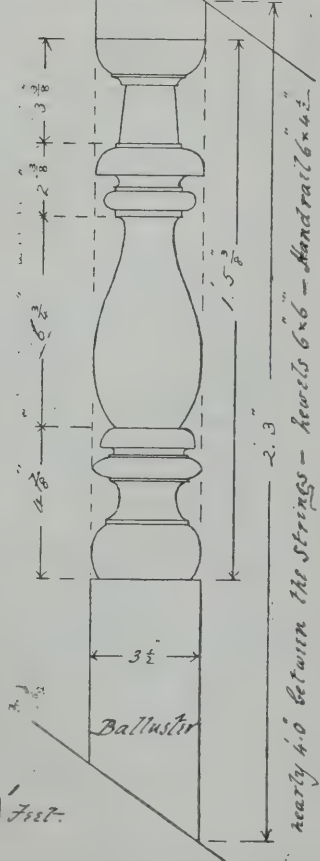
Measured & Drawn by  
J. Hutchings 1888



ST. JOHN'S COLLEGE.

CAMBRIDGE.

TRINITY COLLEGE.



Library Staircase  
Reverts 11 1/2' Risers 6 3/4"  
Width of Staircase between  
Strings 6' 7 1/2"  
Balusters 6' clear apart

Handrail

Baluster

Measured & Drawn by  
J. Hutchings 1888



## THE HOLY PLACES OF JERUSALEM.\*

THE interesting volume that Professor T. Hayter Lewis has brought out is the result of many years of laborious research into the disputed origin of the sacred and other remains in the Holy Land. The learned author has been aided in these researches by those of the Palestine Exploration Fund. The photographs and woodcuts illustrating the work have been borrowed from the Committee. Acknowledgment is also made by the author of the "History of Jerusalem," "The City of Herod and Saladin," by Walter Besant, M.A., and Professor E. H. Palmer, M.A., the late Mr. Jas. Fergusson's "Holy Sepulchre and the Temple at Jerusalem," and other works; added to which the "Ordnance Survey of Jerusalem," with detailed drawings and notes, by Sir Charles Wilson, K.C.B., R.E., must be mentioned. One of the most instructive illustrations is the plan of the noble Sanctuary, showing Capt. C. W. Wilson's and Capt. Warren's researches. Readers of Mr. Fergusson's work on the "Topography of Jerusalem," and other books, will remember that the writer laid down the proposition that the building known as the Mosque of Omar is the identical Church of the Holy Sepulchre erected by Constantine. The question thus settled in his own mind led to the further inquiry as to the site of the Crucifixion. This spot he pointed to as having been about 150 yards from the north-east angle of the Temple. Professor Hayter Lewis quotes Mr. Fergusson, and further points out the steps by which he adopted this conclusion. He was guided by his knowledge of the Dome of the Rock, that it was not a mosque, also by the likeness shown by Ali Bey's description, and Catherwood and Arundale's drawings to well-known buildings of the age of Constantine. The author goes on to say:—"Although they seem (the drawings), so far as I can judge of the copies from them, to have been admirably made, they failed to show two most essential points—viz., that the Dome of the Rock was constructed of materials of other pre-existing buildings, and that it contained—prominently shown in a very conspicuous place—the famous Cufic inscription stating that it had been erected by Abd-el-Melik in A.D. 691." Having, then, this belief that the building really covered the Holy Sepulchre, it became evident that another position, other than that usually assigned to it—viz., over and close to the Sakhra—must have been that of the Jewish temple, and having entered into this part of the subject chiefly by the aid of Josephus, he became firmly convinced that the true position was at the south-west part of the Haram area. This theory has been supported by Thrupp, Lewin, and Prof. Robertson Smith, whose description is given in the new edition of the "Encyc. Britannica." Professor Hayter Lewis enters mainly into the architectural considerations as to the question of the site of the Temple, and points to a few parts which certainly do not establish the south-west position. Amongst these he instances the levels of the rock, the discontinuous structure of the wall. The author accepts Col. Warren's conclusion—viz., "the 600ft. of the wall in its eastern part containing the 6ft. course of masonry represent the 600ft. as described by Josephus, whose description applied to the Temple as built by Solomon, and that the prolongation westward of the wall, which is unanimously agreed to have been built or rebuilt by Herod, was caused by an enlargement by him of the Temple area, which Josephus describes as twice as large as that before inclosed."

Alluding to the other question, as to whether the grand Dome of the Rock over the Sakhra was the work of Constantine, the Arabs, or Justinian, the author gives Mr. Fergusson's opinion in his own words, and while admitting that that edifice was never a mosque, and that the title given it, "Mosque of Omar," is misapplied, he maintains that it was simply an oratory built over the rock to protect the pilgrims who prayed there. A very elaborate criticism is given of the points of resemblance and difference between this edifice and other works of Constantine, and the author shows that the capitals are unlike, and differ in out-

line and size; the shafts in some cases are larger and longer. The conclusion arrived at is that the columns must have belonged to buildings erected after Constantine's time, then in ruins, and were re-erected on the Dome of the Rock. Professor Lewis thinks that Mr. Fergusson was misled by Catherwood's drawings in assigning their structure to the time of Constantine. This portion of the work is well illustrated by buildings and details of that period. We may more justly conclude that Professor Sepp's opinion that the builder of the Dome of the Rock was the Emperor Justinian—an edifice described in such glowing language by Procopius—were it not for the arguments and particulars advanced by Professor Lewis in his interesting work, who expresses his full belief that the Dome on the Rock was the work of the Arabs, designed for them by a Byzantine or Persian architect, built with the capitals and bases and columns found ready to hand.

## THE GROSVENOR GALLERY EXHIBITION OF PASTELS.

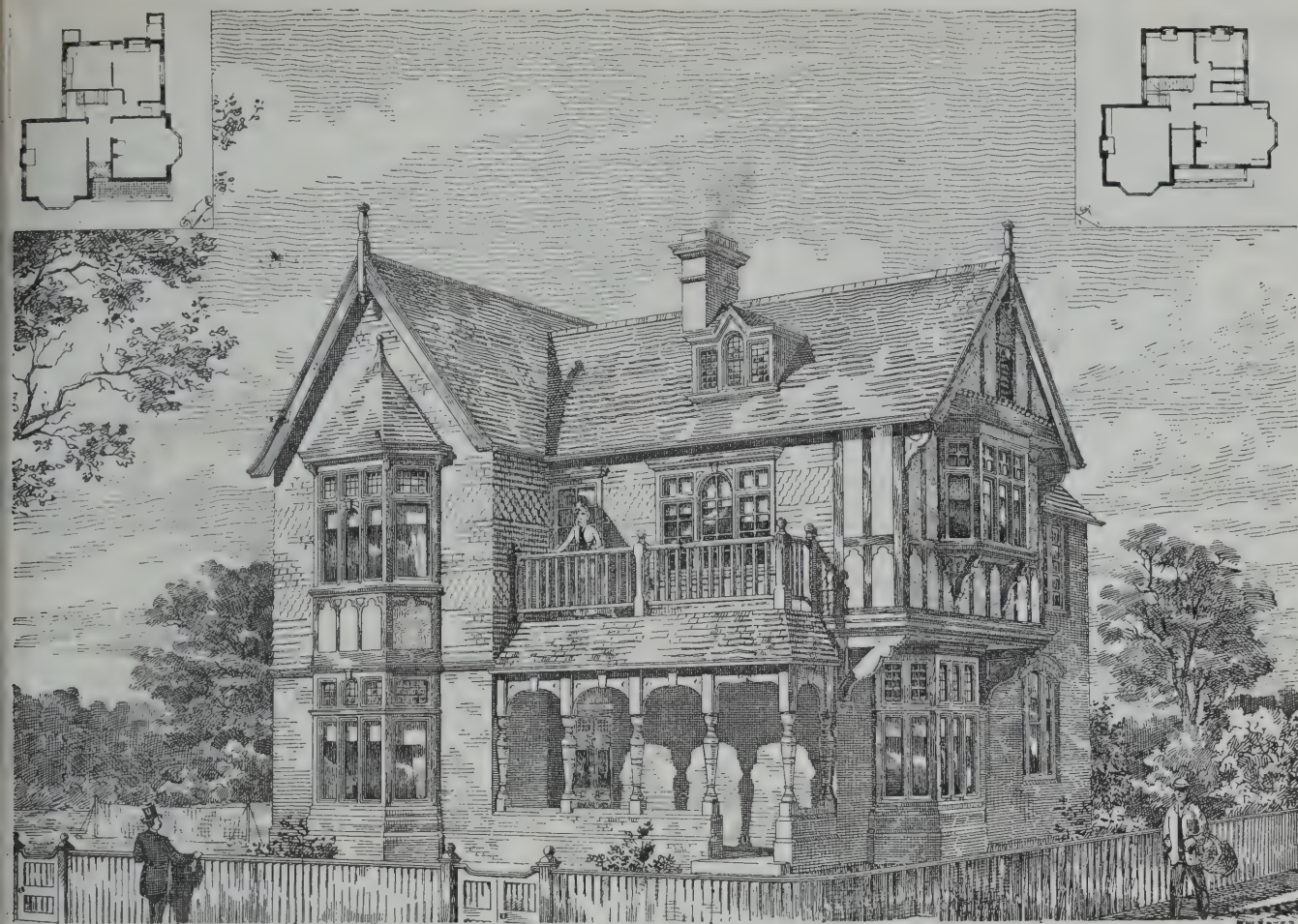
THE admirable collection of pastels which Sir Coutts Lindsay has opened at the Grosvenor Gallery ought to be an incentive to a development of an art that has found special favour amongst French artists. The Société des Pastellistes Français has taken the initiative towards the new movement, and many of the ablest artists of France are members of it. To English artists there is something meretricious in the art of pastel painting; it lacks permanence, and we are not sure whether any process has been discovered to fix the drawing, though it is now asserted that a "fixatif" has been invented. But with all the shortcomings of pastel drawing, a visitor to the Grosvenor will allow that it is a mode of obtaining softness of effect and transparency of colouring that has many advantages over painting with more permanent pigments. The coloured chalk or crayon, a mixture of colour with a colourless base by the aid of some mucilage, gives a delicate blending of tint, and enables the artist to manipulate his colours and to produce a softness unattainable by other means. The rapidity with which pastels can be handled is a considerable advantage in their favour in the execution of portraits which cannot be done in oils at anything like the price. The collection is rich in portraiture, landscape, and idealised subjects. In the west gallery we find several excellent portraits and figure subjects. J. L. Machard, a member of the French Society, has a portrait of a young lady in black hat and fur, attired in a delicate grey dress. For vigour and painting-like effect, the pastel portraits of Anna Belinska deserve a special notice. The "Highlander of the Carpathians" (1)—a dark, handsome face with brown eyes—is remarkable for oil-like solidity and finished light and shade. The same artist sends studies of Polish girls (11, 93), and a "Young Polish Boy" (80). We can praise also the admirable church interior "Confirmation Day" (6), a scene at an altar of a village church, by Leon Lhermitte, a member of the Société des Pastellistes Français. Here the delicacy of tone, the drawing and detail, show how well suited this medium is for subjects which presumably are best rendered in oil. The artist's power of grouping and expression is poetically rendered with much that is picturesque. Mr. J. J. Shannon is a clever and promising portraitist. His "Mary," a study of fair face lit up by a lamp (5), and the rather reddish-toned "Edra," are full of colour and tone. Hubert Vos's "Portrait of Mlle. de Staal" before her easel, is somewhat stiff, though nice in tone. Near this J. Aumonier sends a light and atmospheric landscape, "On the Sussex Downs," the mist and moonlight effect full of air and space, a kind of landscape that appears to lend itself particularly well to pastel painting in the gradation of tone and soft hazy blending of the undulations. E. Tofano's "Été" is a well-drawn piece of summer life. The young lady listlessly lying at length on a river barge, her black poodle by her side, and the bright illumined red of the sunshade against the green trees, make an agreeable picture. So also the pastel of a girl musing to herself as she handles her wedding wreath, by M. J. Davis. J. L. Machard's "Soap Bubbles" (20)—an ideal figure of a girl—is worth atten-

tion. The flesh tints in the last are very delicate and soft, and vies with oil in its softness and transparency. The portrait of a lady, by C. Dubufe, is exquisitely drawn, the black satin low-cut dress displaying the textile with much finish. Next we have a work by J. E. Blanch, another of the members of the French Society, No. 24, which hangs in the centre of the gallery; is a cleverly-drawn study of a young girl in dark maroon dress, with a light buff bib-apron against a light background. The other portraits of this master of the art are of undoubted merit. No. 153, a young lady with long, flowing hair, and portrait of Mlle. Julia Barthe of the Comédie Française, seated, with black dress and white feather-lined cloak, in the centre of long wall, exhibit some of the delicacies of pastel painting of the highest order. M. Emile Lévy, another of the French Society, has a portrait of his daughter and of Madame D. (249), both examples of masterly handling. Atmosphere, life, and movement are noticed in R. Ponsonby Staples' "Ducks on the Round Pond" (27), and in other studies. J. I. Machard's "Juno" is admirable in its delicate and transparent colour; W. S. Coleman's "Blowing Bubbles"; G. P. Jacob Hood's "Ralph" (31) in its fresh colour; Henry Simpson's "King Ethalbold on Croyland Bridge" (33); Hubert Vos's "My Humble Friend," a boy's grinning face (35), are worth mention. The study of green in W. Llewellyn's "Waiting" (37), is striking in its colour-harmony, and in the gradation of tints. Clever in its texture of stone wall is "Master Victor" (38), by Otto Scholderer, a boy attired in a grey-green suit with lace collar of the Cavalier period. Vigorous handling of the crayon is shown in Anna Nordgreen's "Daddy's Darling." The excellent drawing of figures in Eliz. Armstrong's subject (43), with its strong sunlit hill-sides, and in No. 59, deserves praise for the firmness and precision, approaching oil. F. H. A. Parker's "Castles in the Air" (46), a girl seated in a chair in pink dress, and the "Resting" of P. Roll, who also sends "Bathers," are worth remark. The "Siesta" of Arthur Halker is noticeable for the drawing and colour, near which Frank Hind has a nice drawing of "Early Morning Off Venice." Geo. Hare, in his "Portrait of Madame H.," has a well-studied seated figure of that lady, introducing some charming delicacies of colour in the hat and gloves. Of studies of impressionism, we have A. D. Peppercorn's "A Bend in the River." An ideal subject is given by Joseph Knight, "Cloudland" (71). Solomon J. Solomon is a master of this medium. His portrait of Miss Ethel Wright (72) in black grenadine evening dress is a graceful study. Walter Langley, whose water-colour subjects of Cornish fisher life are so well known, sends a beautiful pastel drawing of a Cornish fishwife exquisite in the colour and distant view of quay and boating. Anderson Hague, in "Life's Hardships" (82) and "Evening," displays the master, and some pastel sketches of Venice by J. McN. Whistler are also in this gallery.

In the East Gallery, W. F. Britten, whose work as a painter stands in a foremost place, sends several studies of pastel (102 to 112) highly suggestive in design. His "Wavelet" (108), "The Magi Ring," "Boy and Dolphin" (265), show how well this medium can be used in designs of a decorative character, many of them possessing gracefulness of line and colour. Such are the graceful studies in brown and white lent by Geo. Aitchison, A.R.A. (218, 219). Herbert Schmalz (133) essays one of those cruel historical scenes enacted under the Roman Empire. "In Manu Domini" is a subject similar to one in last year's Academy, where beautiful maidens are chained to posts in the arena of the Colossus, and within sight of wild beasts. "Ashtareth," by C. H. Shannon, is a cleverly-modelled figure, the light and reflection in the fountain vivid and natural. P. Wilson Steers's "Shy"—a child in a cornfield with glowing evening light on his face—is somewhat too crude, though true to the impressionist's idea of bright light. P. Halleu, of the Société des Pastellistes, sends a "Spanish Lady" (148). The drawing is stiff; yet the girl standing in front of a harp is full of life and expression. The clever portrait by P. A. Besnard (152)—a gentleman with etching needle and plate, smoking a cigarette, and one eye closed, is worth notice for the manner the reflection is

\* The Holy Places of Jerusalem. By T. HAYTER LEWIS, F.R.S.A., Emeritus Professor of Architecture, University College. London: John Murray.





HOUSE AT WARLINGHAM, SURREY.—Mr. FREDERIC W. FRYER, Architect.

aged. The same artist's study of girls training and the reflection of light; Bernard Porter's "The Ellen Ashcroft" (155)—a tall girl, with falling dark brown hair—are works of interest. We must also glance at Theodore Russell's "Pierrot" (174), and some studies by William Stott, Mrs. M. H. Earnshaw's portrait (19), and Mark Fisher's clever sketch (205), to indicate the wide application that can be made of this rapid, and at the same time highly effective, art of pastel painting.

## HOUSE AT WARLINGHAM, SURREY.

THIS house, now being built, is an addition to those already built upon the Westhall estate, being well elevated and on chalk soil, stands upon two acres of ground, which will be laid out with tennis lawns, &c., commanding extensive views of the charming scenery of Caterham Valley. It was originally intended to have built a much larger house, but the owner—Mr. Frank Goodingham—ultimately decided to postpone the larger building until next spring. The walls are of best red bricks, pointed in "black" mortar, with a peasey tiled roof and weathering. The drainage is a perfect system of double drainage, each drain being of immediate access in inspection chamber. The architect is Mr. Frederic W. Fryer, M.S.A., of 2, Pancras-lane, London, and Beckenham, who also prepared the plans for the larger building. The builder is Mr. W. Jones, of Crescent Works, Beckenham.

The church of the Holy Redeemer, Exmouth-street, Clerkenwell, London, was consecrated by the Bishop of London on Saturday. The new church, which occupies the site of the Spa Fields chapel, and was given by Lord Northampton, is in the style of the Early Renaissance. The cost of the structure is about £7,000.

A new Wesleyan Chapel at Paddock Wood, Kent, opened on Tuesday week. It has been built, at a cost of £580, by Messrs. White and Humphreys, Tunbridge Wells, from plans and under the supervision of Mr. John Fagg, of Tunbridge.

## ARCHITECTURAL &amp; ARCHÆOLOGICAL SOCIETIES.

THE GLASGOW INSTITUTE OF ARCHITECTS (INCORPORATED).—The twenty-first annual general meeting of this Institute was held on the 17th inst., Mr. David Thomson, president, in the chair. Mr. William Maclean, secretary, submitted the report of the year. It referred to the opening of classes in connection with the Glasgow Technical College for the education of architectural students and apprentices, and also stated that rules for the measurement of wright work had been revised by delegates from the different associations concerned. The president said it was expected the International Exhibition would yield a very heavy surplus. It had struck him to suggest whether they might not approach the executive to see if they might possibly spend eight or ten thousand pounds of the surplus in establishing a Chair of Architecture in the University of Glasgow. He expressed his belief that they might look forward to a more prosperous condition of affairs than had been for the past five or ten years. The following appointments were made for the coming session:—President, Mr. John Gordon, 134, Bath-street; vice-president, Mr. William Leiper, 176, Bath-street; hon. treasurer, Mr. T. L. Watson; auditor, Mr. James Thomson, 88, Bath-street; secretary, Mr. William Maclean, writer, 115, St. Vincent-street.

GLASGOW ARCHITECTURAL ASSOCIATION.—A meeting of this Architectural Association was held on the 17th inst., Mr. James Thomson, F.R.I.B.A., president, in the chair. Professor G. Baldwin Brown, of Edinburgh University, delivered an address on "The Art of Decoration."

MANCHESTER ARCHITECTURAL ASSOCIATION.—The fourteenth session of the architectural Association was inaugurated on Tuesday evening, the 23rd inst., by a conversazione in the Athenæum Hall, Manchester. Mr. A. H. Davies Colley, A.R.I.B.A., delivered a short address. The following members took prizes in the elementary classes:—First prize, class of design, Mr. A. S. Chadwick; second prize,

class of design, Mr. A. H. Mills; class of construction, Mr. R. Booth. The invitation card was specially designed by Mr. W. K. Booth, architect, showing several ancient Manchester buildings tastefully grouped.

## CHIPS.

The Directors of Robert Boyle and Son (Ltd.), Ventilating Engineers, London and Glasgow, have resolved, subject to audit, to recommend a dividend of 12 per cent., free of income-tax, on the ordinary shares of the company for the year ending September last, after placing to reserve fund one-sixth of the profits earned, and carrying forward £1,241 10s. 4d.

Memorial stones of a new Free Methodist Chapel, now in course of erection in Calverley-lane, Rodley, near Leeds, were laid on Saturday. The chapel is being built of red sandstone, in the Italian style, from the designs of Messrs. Kendal and Bakes, architects, Idle. The cost, including that of the land, will be about £2,000.

On Friday a new Wesleyan chapel was opened for public worship at Norton Down, on the high road between Radstock and Wells. The building is of Gothic design, and is built of native stone, with mounted limestone and freestone dressing. It is 54ft. by 20ft., with a transept and vestry. The pulpit and font are of serpentine marble. The windows are of stained glass. The architect of the building is Mr. A. Baker, of Swindon, Wilts, and the builder was Mr. W. Aubrey Catley, of Midsomer Norton. The cost was £1,000. Accommodation is provided for 150 persons.

A stained-glass window of two lights has been placed in the chancel of Donnington Church in memory of the late Rev. J. D. Grenside, for 35 years vicar. Messrs. Hardman and Co., of London and Birmingham, executed the work.

St. Michael's Church, Black Tawton, Devon, was reopened on Tuesday after partial restoration, the works including new roofs, seats, and floors, executed at a cost of over £700.

A vestry screen in English oak, and of 13th century character, has just been placed in the parish church of the Holy Cross at Standlake, Oxon. The work was designed by Mr. Clapton C. Rolfe, of Oxford, and executed by Mr. Harry Hems, of Exeter.



## Building Intelligence.

**BINGLEY.**—The foundation-stone of the new Technical School for Bingley will be laid tomorrow (Saturday). The architects are Messrs. Bailey Bros., of Keighley and Bradford. The front elevation faces the Mornington-road Board School, and shows a length of 62ft., and a height of about 50ft. The building is a three-storied one, constructed of stone. In the basement there are caretaker's apartments and store rooms. Branching off from the lobby and hall, which run through the centre of the ground floor, is a series of rooms which will be fitted up with technical appliances. The weaving room is 36ft. long by 30ft. wide, and adjoining it are a designing class-room, chemical laboratory, &c. On the same floor there are a preparation room and a lecture room, the latter fitted with a small gallery. The first floor of the building is reached from the hall by a stone staircase. This floor is occupied by four large art class-rooms, together with a master's room and offices. The accommodation on the second floor is confined to two or three small rooms.

**COLINTON, N.B.**—A new Episcopal church is about to be erected in Westgarth-avenue in this suburb of Edinburgh. Designed by Mr. Rowand Anderson, LL.D.—himself one of the committee—the church will be in the Late Gothic style, the chief external feature being a square tower on its south side. Internally, the church is divided into a nave 45ft. long by 20ft. 6in. in breadth, and a chancel 20ft. by 14ft., accommodation being thus provided for 200 people. Transepts can be added as the congregation grows. The roof is an open timber one. The church is to be built of red Hailes rubble, with redstone dressings; and the roof will be covered with red tiles. The cost will be about £800. The first sod was cut on Saturday by Mrs. Rowand Anderson.

**HAVERFORDWEST.**—Extensive alterations and additions at Scotchwell, which, during the past eighteen months, have been in progress at this old Pembrokeshire seat, are now completed, and Mr. Louis Samson, the owner, has taken his permanent residence there. New buildings have been erected on the north-west side of the original house, and are in character with it. The new wing consists of a large drawing-room, nine bed and dressing rooms, a bath-room, and commodious offices; whilst the other alterations comprise an enlargement of the hall, the construction of a new vestibule, and the rearrangement of the billiard-room. In building the new wing some three thousand loads of loam and rock had to be removed, and the steep banks on the north and west sides of new building have been laid out in terraces and serpentine walks, connected with each other by means of circular steps and dwarf stone walling and a rustic bridge, which leads from the new drawing-room to the terraces. The whole arrangement has a good effect. The whole of the works have been carried out from the designs and under the personal supervision of the architect, Mr. Alfred Guy, of London, who visited the works monthly, no clerk of works being engaged. Messrs. Williams and Sons, of Narberth, South Wales, were the general contractors. The wood-block flooring to hall, dining-room, and study was executed by the Wood Block Flooring Company, Charing Cross, London, S.W. The stoves and chimney-pieces were provided by Messrs. G. Wright and Co., Queen Victoria-street; the wine-cellar fittings by Messrs. Farrow and Jackson, Haymarket; the painting and decorating of the whole building have been executed by Messrs. Reynolds and Co., of Haverfordwest, under the direction of the architect.

**LIVERPOOL.**—The foundation-stone of a Sheltering Home for Destitute Children was laid in Myrtle-street on the 17th inst. The building adjoins the old premises of the home, and is faced with Doulton's red brick, terracotta being used for dressings. The schoolroom and classrooms are placed at the rear of the site. The ground floor will be devoted to stores, sewing-rooms, and administrative purposes, and on the upper floor will be six large dormitories, three for either sex, with separate staircases, bathrooms, and lavatories. Messrs. C. O. Ellison and Son, MM.S.A., are the architects, Mr.

Thomas Urmston is the sole contractor, and Mr. Higginbotham the clerk of works.

**LOUGHTON, ESSEX.**—A new Board school for 360 boys was opened on the 22nd inst. The buildings comprise a general schoolroom 93ft. by 22ft., lighted by large and lofty windows along one side and one end; three classrooms opening out of it, each 30ft. by 22ft.; a master's room and a cloak-room; boiler-room and store-rooms in the basement. As the ground falls from front to back, a covered playground is formed below the whole area of the largest room. The walling is of picked stocks and of local red bricks, with dressings of hard pressed bricks from Birmingham. Where there is reason to expect most wear and tear the corners of the jambs and piers are formed of Staffordshire rounded blue bricks. The roofs are covered with Reading tiles. A specially-arranged system of inlet and outlet ventilation is adopted in the schoolroom and classrooms. The heating, on the low-pressure system, has been undertaken by Messrs. J. Jones and Sons, of Farringdon-street, E.C. The builders are Messrs. Everett and Son, of Colchester, and the architect is Mr. James Cubitt. The contract for the buildings, including drainage, boundary walls, and the formation of a large playground, amounted to £2,950.

**ST. CROSS, SUFFOLK.**—On Monday week memorial services were held at the parish church of St. Cross, near Bungay, on the completion of the restoration of the tower to the memory of the Rev. Canon Smith, the late rector. The tower, which dates from the early part of the 15th century, is a plain but good specimen of a Suffolk tower of the time. A moulded arch, with carved capitals, into the nave has been opened up, a modern ringing floor which blocked the western window having been removed. The tower is 16ft. 6in. square and 58ft. high. The restoration work includes a general repair of the walls and parapet and renewal of the stonework to the belfry windows, a large portion of which was missing, a new roof in oak, covered with lead, new oak louvres in the belfry windows, and the rehanging of the peal of five bells. The work has been executed, under the supervision of Mr. E. F. Bishopp, architect and diocesan surveyor, by Messrs. R. Stone and Son, builders, of St. Cross, with Mr. Perfitt, of Harleston, as mason. The same architect and builders carried out the restoration of the nave and chancel last year. The new reredos and altar table, also executed from Mr. Bishopp's designs, are the gift of Mrs. John Mackie, of Tiggleston, Wakefield, sister of the late Canon Smith. It is constructed in English oak, and rests upon a polished Devonshire marble slab, with sub-base in yellow magnesian limestone. The work has been executed by Mr. Godbold, of Harleston.

**TUNBRIDGE WELLS.**—The new Church of St. Barnabas in Stanley-road was opened by the Archbishop of Canterbury last week. The building consists of chancel 36ft. 6in. by 25ft., and 67ft. in height to ridge of roof, having organ-chamber on the north side, and on the south a morning chapel, 36ft. by 17ft.; nave, 93ft. by 31ft. 8in., and 73ft. high to ridge, with aisles each 10ft. 3in. wide and 93ft. long, while provision is made for the future erection of a tower and spire 190ft. in height. The building is of High Burrows brick, with dressings of Southborough stone. A noticeable feature is the large amount of moulded and carved stonework. The church seats over 900 persons, and has cost, without the fittings, over £15,000. Messrs. J. E. K. and J. C. Cutts, of London, are the architects; Mr. Thomas Williams, of London, was the builder; and Mr. Robert Eastman, the clerk of works. Mr. Harry Hems, of Exeter, and Mr. S. Ruddock, of London, executed the carving; Messrs. Singer and Sons, of Frome, the wrought-iron chancel screen and other ironwork; Messrs. Heaton, Butler, and Bayne, of London, the stained glass and decorations; Messrs. J. and E. Goad, of Plymouth, the marble work; and Messrs. Plows and Foxton, of Brixton, the alabaster work, &c.

**WOLVERHAMPTON.**—The new Eye Infirmary was opened by the Earl of Dartmouth on Tuesday. The new building supercedes the infirmary established five years ago in St. Mark's-road, and is situated in the Merridale-road. It consists of a main block for the in-patient department, with a wing next to the

Compton-road for out-patients, with separate approaches. The in-patient department is a building three stories high, in shape forming the letter E, with a central entrance, and it is designed on the corridor system. Two wards are provided on either side of the corridors each 16ft. by 12ft., for men and women respectively. On the same floor is provided accommodation for the house surgeon, matron nurses, as well as offices, public waiting-rooms, &c. The basement is devoted to the domestic offices. On the first floor, reached by two separate sets of staircases, the arrangements correspond exactly with that on the ground floor, each half being appropriated to men and women respectively, and having one large ward and three smaller ones, bath-rooms, lavatories, &c. Over the out-patient department is an operating theatre. Hot-water heating is general in the principal rooms and corridors. Externally the buildings are of simple treatment of Domestic Gothic character. The materials are red brick with stone dressings, and the roofs are covered with tiles. The main entrance is carried up to form a tower, rising to a height of about 75ft. The whole work has involved an outlay of £8,000. Mr. T. H. Fleeming, Wolverhampton, is the architect and Mr. H. Willcock, Wolverhampton, the builder.

### COMPETITIONS.

**GLASGOW.**—The design of Mr. T. L. Watson, F.R.I.B.A., of West Regent-street, Glasgow, has been chosen for the Royal Clyde Yacht Club house. The selection of the committee was based on the report of the professional referee Mr. Wm. Leiper, F.R.I.B.A., who recommended this plan for erection.

### CHIPS.

The first ordinary meeting of the Surveyors Institution for the present session will be held on Monday, Nov. 12, when the president, Mr. Elias P. Squarey, will deliver an address.

Miss Jane Harrison is about to give a course of five lectures at the South Kensington Museum upon "The Cults and Monuments of Ancient Athens," with special reference to recent excavations. The lectures will be delivered on Fridays at 5.15 p.m., beginning on Friday in next week November 2.

The Bishop of Pretoria has taken back with him a set of plans for his cathedral of St. Alban's designed by Mr. William White, F.S.A. Probably nothing more will be attempted at present than two or three bays of nave and aisles added on to the east end of the existing temporary building which would be used for a time as a chancel. The plan is cruciform, with semi-apses to chancel and transepts. The chancel apse is arcaded, with an ambulatory connecting the two chancel aisles which also are apsidal, and which form the vestrie and site for organ. The nave walls with clerestory are 40ft. high. The extreme dimensions are 195ft. by 80ft. The building will be chiefly of brick, but with stone columns, caps and bases, of a very simple form, on account of the great cost in working so hard a material. It is proposed to cover the roofs with sheet iron, which is much used in the colony.

The following names of builders appear in Friday's *Gazette* among the adjudications in bankruptcy:—John Edward Clarke, Leicester; Henry Honeychurch and James Richard Mitchelmore, late of Northam, now of Southampton; George Masters, Station-road, Anerley; and William Roger Birkenhead.

At the Michaelmas Quarter Sessions for Durham a letter was received from Mr. Crozier resigning the post of county architect through ill-health after forty years' service. The resignation was accepted with regret, and the highway committee were instructed to take steps to bring the question of a successor to Mr. Crozier before the court at the next quarter sessions.

The vestry of Lambeth have, by a majority of 74 to 19, voted £1,000 an acre towards the purchase of the Vauxhall Park—the Lawn and Carrou House Estates, South Lambeth-road, being about 8½ acres in area.

An organ in St. John's Mission Church, New castle-under-Lyne, built by Messrs. Wadsworth, of Manchester, at a cost of £280, was opened on Friday.

A new Board school at Dollar, N.B., erected at cost of £2,000, from plans by Mr. Baldie, of Glasgow, was formally opened on Wednesday week.



## TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

[It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions. Cheques and Post-office Orders to be made payable to PASSMORE EDWARDS.]

## TERMS OF SUBSCRIPTION.

One Pound per annum (post free) to any part of the United Kingdom; for Canada, Nova Scotia, and the United States, £1 8s. 8d. (or 7dols. 30c. gold). To France or Belgium, £1 8s. 8d. (or 36fr. 80c.). To India (via Brindisi), 17s. 4d. To any of the Australian Colonies or New Zealand, to the Cape, the West Indies, or Natal, £1 10s. 10d.

## ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is, per line of Eight words, the first line counting as 10, the minimum charge being 5s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous Trade Advertisements (except Situation advertisements) is 6d. per line of eight words (the first line counting as two), the minimum charge being 4s. 6d. for words. Special terms for series of more than six sections can be ascertained on application to the Publisher.

Front Page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No front page or paragraph advertisement inserted for less than 5s.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

## NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLI, XLVI, XLIX, L, LI, LII, LIII, and LIV may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 3s. each. Reading cases 2s. each.

RECEIVED.—O. M.—J. H. and Co.—W. G. and Son.—E. H. S.—O. Co.—W. N.—L. T. D.—G. R. and Co.—G. and Co., Ltd.—M. D. and Co.—B. G.—C. of T.

SHIELD. (Very likely; but whose fault was it but your own? Deal with respectable firms such as advertise in these pages.)—W. B. (You want a sunlight; write Strode and Co.)—J. P. (Cannot say; we shall hear what Rhamadanthus at Conduit-street has to say presently, we suppose; so far it seems as if somebody was afraid to post up the black list.)—H. HOBSON. (We fear there is some truth in the story; the jackal died not long since; but it is said he was the author of every plan except the disastrous one you refer to.)—ONE AND TWO. (We have heard good accounts of the Adamant Cement, and should certainly try it.)

## Correspondence.

## ARTS AND CRAFTS.

To the Editor of the BUILDING NEWS.

SIR,—Here is another catch-word to lead the public astray, and the arts and crafts into wrong courses. It would seem as if there were a conspiracy of "fadding" to ruin the arts and crafts of this country. We are not astonished that "many firms that one would expect to see represented here hold aloof." Those firms show their wisdom, for if this project were to be encouraged for the motives assigned by its promoters, the true relations of manufacturer, artist, and craftsman would be utterly subverted.

Another utterance of Mr. Walter Crane's exposes and explodes the gaseousness of the purpose of the Arts and Crafts Exhibition. "Many young men," he says, "with a taste for art are tempted by the popularity and fortune of a few prosperous painters to devote themselves to pictorial art, without any conspicuous talent for it, who might find useful and profitable scope for their artistic instincts in the decorative arts."

In the foregoing words the President of the Association proposes that men who have no conspicuous talent as artists might find useful

and profitable scope for their artistic instincts in the decorative arts. Is it the work of such that find a place in the New Gallery?

No, Mr. Crane, this is not the way by which the arts and crafts are to be promoted; but by men, who have a conspicuous talent for art, stooping to humbler things, and lifting them to art rank by the elevating power of their genius.

Thus it was in the Mediæval and Renaissance times. Thus it was, too, at the end of the last and the beginning of the present century in England, when Flaxman glorified pottery and enriched Wedgwood. Men with "no conspicuous talent for pictorial art" cannot have considerable "artistic instincts": they may be able to find useful and profitable employment—we hope they may; but there is no reason why the "personality" of such talent should be dragged before the public. The reputation of the factory and of the trade is sufficient for them—that of the outer world must be reserved for the enterprising capitalist and his art-director. It is strange, passing strange, that manufacturers do not perceive that it is consummate art direction that would enhance the quality and value of their wares, not the employment of persons possessing a small amount of art schooling.

But before and above all this, the question that has to be decided is, Whether this craze for ornamentation, for overlaying with ornament, is a sign of good taste? We rather hold with Shakespeare in thinking that there is more beauty in proportion, in simplicity—in fact, that we do not require so much ornament as the arts and crafts would have the public believe. "The world is ever deceived by ornament." Modern house decoration and furnishing tends to the over-much in ornamentation, and by this very excess becomes surfeiting and vulgar. There was nothing of this kind with the Greeks. Are we to set up the barbarisms of Mediæval and Renaissance fashions above the true and pure feeling of Hellas? Why cannot we move upon lines that would make English taste the model for the world, instead of imitating, as our would-be promoters of arts and crafts would have us.

The feeling for beauty is very general, as we may see in the byways, in the window-gardening, the gathered flowers, and in the shells, &c., on humble mantelpieces. We believe this natural taste would have found its natural haven of repose, had it not been for the endless art-quackeries that have been promulgated. It was never intended that nature should be wholly beautiful, but only sparsely flowered with beauty. If it had been purposed otherwise, or that all things should be beautiful, it would have been so, and there would have been not the slightest occasion to write upon the subject or to trouble ourselves about the matter. Let there be an exhibition of arts and crafts by all means, but do not make such an exhibition an instrument for the subversion of the true relations of manufacturer, artist, and craftsman.—I am, &c., VIGILANS.

## A PHANTOM CLIENT.

SIR,—There is a person in the Midland Counties, of middle height, about forty years of age, who wears a sandy moustache, and whose writing and spelling are emphatically bad. This man's ways are dark, and he has been practising an extensive system of fraud on architects and builders. His method is as follows:

He obtains land and calls on an architect, whom he asks to prepare plans and obtain tenders. These being satisfactory—and the larger the better—he is in a great hurry to start building. He is particularly anxious that plenty of material should be got on the ground before the excavations were started, for, says he, it might else obstruct the pathway. He demurs to paying any instalment until the building is roofed in. When, however, the first instalment is due, he obtains a mortgage on the building and on the materials on the ground, and is heard of no more.

If asked for references, he is most willing to comply. He writes his own, and goes to the town and posts them, or else, as I believe, is assisted by an accomplice. This probably is the only expense of the trade.

I and a builder are his last victims. I think his very last, for henceforth he will not be

under the necessity of providing for himself. I shall feel much obliged if those who have suffered from this man or from a similar fraud will communicate with me without delay, as I am desirous of obtaining information against him. I already know of six towns where he has been in practice.—I am, &c.,

W. H. BIDLAKE.

24, Waterloo-street, Birmingham.

P.S.—The individual referred to above is identical with the subject of a letter from Mr. Ellis in the BUILDING NEWS of August 27.—W. H. B.

## SHARKS IN THE IRON TRADE.

SIR,—It seems a pity there is no recognised means of ascertaining the status of certain firms in your great city who send out big lists to entrap the unwary and innocent countryman.

Requiring a small quantity of ironwork, I sent to a City firm for the same without troubling them for an estimate, thinking the amount insufficient (less than 12cwt.). What was my surprise, however, to find I was charged no less than £27 4s. for the same. Remonstrance was useless. There was no mistake—I must pay.

I then did what I ought to have done in the first instance—I wrote to Measures Bros. and Co., and others, and received quotations for exactly the same goods at £9, or one-third the price I had been charged.—I am, &c.,

A COUNTRY BUILDER.

## SUBSTITUTION OF OTHER MATERIALS.

SIR,—In last week's number of your paper you gave an account of a meeting of the Committee of the Exeter Local Board, describing the failure of a reservoir and complaints of other work carried out at the Asylum. As to the reservoir, it appears to have been specified by the architect to be lined with Claridge's asphalt; but the builder says, "No; I will line it with another and local material," thereby ignoring his bond with the authorities. The architect, however, consented, without asking in what way the committee was to be benefited by the substitution, as it has now proved of more than a questionable material.

Have my brother professionals ever asked themselves this question: "What right have we, having completed our specifications, to vary the materials in any way without the consent of our clients?"

Were this admitted as a principle in our practice, 2ft. thickness, or any other, might be reduced to one-half, and so on throughout could changes be made without the knowledge of the client, who alone is the contracting party, and not the architect. It is clear he would have a right of action, in my judgment, against any architect so abusing his trust.—I am, &c.,

A PROVINCIAL ARCHITECT.

## THE DRAUGHTSMAN'S PROVIDENT SOCIETY.

SIR,—The Committee of the Draughtsmen's Provident Society propose to hold, at the end of the year, when their annual meeting takes place, a public dinner. They are anxious to have a good many draughtsmen there, and it is for that reason this intimation is sent to you now, so that there shall be ample notice.

The dinner will be held in a central position in London, and the tickets will be as cheap as possible—about 5s. per head.

Unless a fair number of draughtsmen signify their intention of coming, the proposal will not be carried into effect. Will, therefore, those who are anxious to partake of this dinner let the Committee know, so that arrangements can be made at once?—I am, &c.,

W. A. CHAMBERS.

24, Myddleton-square, E.C., Oct. 20th.

## A CORRECTION.

SIR,—I see an announcement in your last issue that I am the architect for new vicarage for All Saints, Southport. This is not the case; Mr. Hy. Jones, of this town, being the architect for same.

I shall be obliged if you will make this correction in your next publication.—I am, &c.,

E. W. JOHNSON.

Albany Buildings, Lord-street, Southport, October 18.

The eleventh annual exhibition of the Royal Scottish Society of Painters in Water-Colours was opened on Monday in the Fine Art Institute Galleries, Sauchiehall-street, Glasgow.



## Intercommunication.

### QUESTIONS.

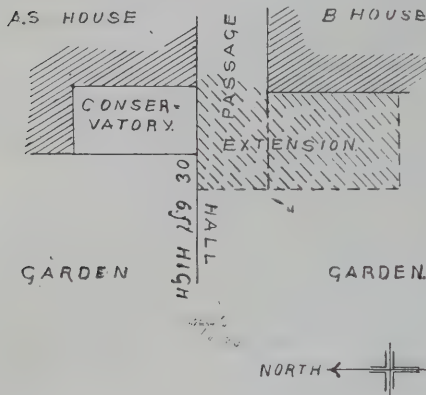
[9797.]—**Algebra and Trigonometry.**—How far is it necessary for an architectural student to follow up these branches of mathematics—say, for the R.I.B.A. exam.?—PROVINCIAL.

[9798.]—**Wooden Oil Tank.**—Will any one kindly tell me what preparation I should use for a wooden tank being built to contain pure olive oil, to form a coating which will prevent the absorption of the oil into the wood, and yet not in any way affect its purity?—TANK.

[9799.]—**Engineers' Charges.**—Is there any scale published of engineers' and land surveyors' charges, same as of architects' in "Molesworth"?—FAIRATION.

[9800.]—**Waterworks.**—Will some of your readers inform me if a contractor for waterworks is liable for damage done by floods during progress of works, and especially if he can be compelled to rebuild masonry of by-wash damaged in this way?—HYDRAULICS.

[9801.]—**Light.**—A. and B. are neighbours occupying adjoining detached houses, a passage about 5ft. wide on B.'s side separating the two thus:—A. has a conservatory, as shown by sketch, with uninterrupted light from the

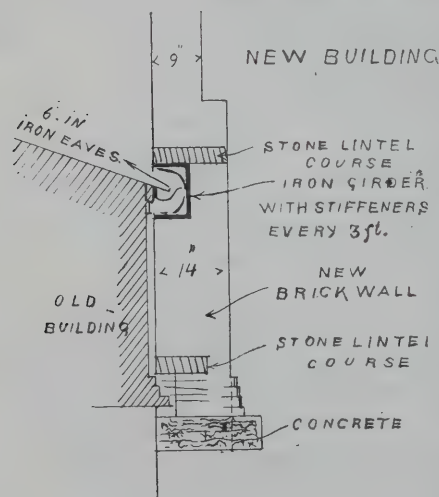


south, which has been enjoyed nearly 20 years. B. has extended his house by enlarging the dining-room to take up the passage, as shown by the dotted lines to 3ft. beyond A.'s conservatory and 20ft. high, thus shutting out the south light completely. A. has objected to what B. is doing, who contends he is within his right. An opinion will oblige.—VERNON.

### REPLIES.

[9779.]—**Eaves.**—"K.'s" advice would be very good had the premises in question been recently erected; but, on the contrary, "E. D. W." states that the eaves have overhung his property for 30 years, and thus an easement has undoubtedly been acquired by the owner of the building. If, therefore, "E. D. W." were to adopt "K.'s" advice and remove the projection, notwithstanding the owner of the building refusing his sanction, he will be placed in rather an awkward position, as I believe he will find he has no right so to interfere with the said eaves in any way without the consent of the owner. I would suggest, if not too late, that he should follow "K.'s" advice to the extent of endeavouring to obtain the owner's permission to remove the projection; but in the event of failure, to so erect his new building as not to interfere with the prescriptive rights of the adjoining owner; but as "E. D. W." does not give any particulars, no one can suggest the modus operandi.—G. A.

[9779.]—**Eaves.**—I had a similar case to that mentioned by your correspondent, and the sketch shows how I got over it. The other side has acquired a right—



'twas the same in my case. He will expect to let the down spout remain (also an acquired right), and will claim a right to clean out and paint his gutter, therefore he must leave 4in. clear above the eaves. I put 2in. of

asphalte between the two walls as the new one was built up, and also the lower part of the girder, in case of overflow. I have had some curious experience in this kind of work.—H. T. PERCIVAL, Architect and Surveyor.

[9790.]—**Foundations and Excavations.**—In practice the custom of taking the same dimensions for both concrete and lengths of walls makes very little difference in the result; but for an examination, I advise "Student" to do his work with scrupulous accuracy.—H. L.

[9790.]—**Joiners' Company.**—I can see no advantage in a working joiner joining the livery of the Joiners' Company. Being a liveryman gives few practical advantages. I should hesitate if I had my time over again.—H. L.

[9792.]—**Quantity Surveying.**—There is no examination in quantity surveying only; but the subject plays an important part in the examinations of the Surveyors' Institute, which I strongly recommend to "Streons".—H. L.

[9793.]—**Valuer's License.**—The ordinary measurement and valuation of builder's work does not require a license; but if "Pulpit" values for probate, or any other purpose where the amount arrived at is binding on others, then let him take out a license, costing £2, and dating from July in each year.—H. L.

[9794.]—**Inclosure for Hot-Water Coil.**—Some years ago Messrs. Shapland and Petter, of Barnstaple, made from my design and detail a carved polished oak coil case, lined inside with pine, and on that asbestos canvas it stands well. The top is covered with cloth to suit the hangings, and the pine that is seen between some of the perforations of carvings is treated to harmonise with carpet.—W. T. C. CRICHEL.

### CHIPS.

The first pile of a new pier at Boscombe, near Bournemouth, was driven on Wednesday week. The present section of the pier will be 400ft. long and 32ft. wide, but will be eventually doubled in length. Mr. E. Howell, of Poole, is the contractor, and Mr. Edmunds, of Southbourne, has the contract for the pier approaches.

The Marchioness of Salisbury opened, on Saturday, the premises in Brook-street, Salisbury-square, taken by Miss Charlotte Robinson (Home Art Decorator to Her Majesty) for the decorative work of the artists employed in her London and Manchester studios.

A new police-station has just been erected by the highway committee of the Salford Corporation at Pendleton. The station, which adjoins the Pendleton town hall, contains four cells, a large charge office, and a dwelling-house for the inspector. It is a substantial brick building, with stone dressings, and has been built from designs by the borough engineer, Mr. Arthur Jacob, at a cost of £1,260.

At the last meeting of the City Corporation a report was read from the City Lands Committee relative to the fall of a small portion of the patera ornament under the abacus of the Monument. The report stated that the patera was found to have been carved on separate pieces of stone fixed by an iron pole, the oxidation of which had caused the fall. The City architect, Mr. Peebles, had recommended the removal of the patera. There was no settlement in the foundations, and the Monument was perfectly perpendicular and safe. The report was adopted.

A new peal of eight bells, which has just been hung at Woolton parish church, near Warrington, was rung for the first time on Wednesday week. The peal, which has been erected by public subscription, cost £700, and has been cast by Messrs. John Taylor and Co., of Loughborough. The tenor bell of the Woolton peal weighs nearly one ton, the diameter across the mouth being 3ft. 11½in. The net weight of the eight bells is about four tons.

Messrs. Jones and Willis, of London and Birmingham, have just completed and fixed at St. Giles Church, Cripplegate, a wrought-iron screen of fine workmanship and design, an elaborately carved altar table and super altar in oak and ebony, also clergy desk and seats, from the designs of Mr. Hammond, architect, Circus-place, E.C.

Messrs. Clark and Co., of the Anchor Thread Mills, Paisley, have purchased about ten acres of Linside Nursery, for the purpose of extending their factories. The price is about £12,000. Messrs. Coats are also at present erecting a large mill in connection with their already extensive thread factories, and Messrs. Doulton, potters, London, are about to establish a branch of their works in the burgh.

A new science, art, and technical school, added to the Burnley Mechanics' Institution at a cost of £6,000, was formally opened on Friday, and the students' prizes were afterwards distribute by Sir Ughtred Kay Shuttleworth, who suggested that there should be more interchange of opinion between officials in London and schoolmasters and managers, so that officials might come in contact with the practical views of men who understood the needs of each district.

## Our Office Table.

THE architects of Maine State, U.S.A., have agreed upon a uniform scale of charges architectural services. Previously the charges had been 2½ per cent. for plans and per cent. for superintendence, this percentage being reckoned on the total cost of the building. This division of charges was not in accordance with the rates adopted by the American Institute of Architects, which are 3½ per cent. for plans and 1½ per cent. for superintendence making the same total of five per cent. on cost for full services. The rates fixed by the American Institute have now been unanimously adopted, and will apply to work costing more than £1,000. For work costing less than that sum a list of special rates has been arranged, running up to 7½ per cent. for works costing less than £300. This is exclusive of travelling expenses and all quantities. The schedule adopted declares that "drawings and specifications are instruments of service, and the property of the architect," and defines architectural supervision as consisting of "such occasional visits as may be necessary to insure the conformity of the building to the design indicated by drawings and specifications." The architects agreeing to the schedule emphatically state that they "do not agree to exercise the close supervision of a clerk of the work nor to be responsible for the failure of mechanics to conform to the standard of workmanship called for by drawings and specifications."

THE Victorian Institute of Architects recently held their annual dinner in Melbourne, the President, Sir George F. Vernon, K.C.M.G., C.B., in the chair, when frequent and laudatory references were made to the Registration of Architects Bill, now under consideration by the Colonial Parliament. Mr. Billing, in responding to the toast of the evening—"Success to the Institute"—said the Bill had now reached a tangible form, and drafts were to be sent to every member of the profession. He explained that under its provisions all members of existing recognised bodies would be registered without examination, as also all architects who were over 25 years of age, and had been in practice for three years before the passing of the Bill. The same privilege would be allowed to assistants of long standing. A council would be appointed to superintend the examinations and make rules for the carrying into effect the purposes of the Bill. After the passing of the Bill an architect could practise for himself unless he had served a term of four years in an office, had passed the examinations to the satisfaction of the council. This would remedy the evil of spurious reputations obtained by competitions by the work of apt assistants and other unfair means.

THE Hellenic Society held a meeting Monday, when a paper on the Temple of Apollo at Delphi was read by the hon. secretary, on behalf of Professor J. H. Middleton. The author remarked that Greek traditions spoke of five successive temples on the site. The fifth temple, of which remains still exist, was built by a subscription raised throughout Greece under the authority of the Amphictyonic Council. The Alcmaeonidae of Athens were the contractors. The architect was Spintharus, a Corinthian. This temple, with its sculptures, paintings, and other adornment was described in detail. Passing to the existing remains, Professor Middleton showed that the temple was hexastyle, and peripteral, in the Doric order, with the probable dimensions of 192ft. by 72ft. 6in. on the top step. It was built of limestone, coated with the finest stucco. Comparing the style of the details with those of other Doric temples, he conjectured that it must have been later than the temple of Corinth, and possibly also than that of Aegina. The face of the wall inclosing the *temenos* was covered with closely-cut inscriptions, dating from the end of the third century B.C. to the time of Hadrian.

A new Wesleyan chapel at Eldwick, near Bingley, was opened on Friday. It seats 200 persons, and has been built from designs by Mr. Bruce, of Eldwick.



# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1765.

FRIDAY, NOVEMBER 2, 1888.

## TECHNICAL ARCHITECTURE AND ITS ALLIED TRADES.

IN the course of another month the various architectural societies will have opened their doors for another session; but whether with any appreciable effect on the practice and art of the profession will depend upon the zeal and enterprise that are thrown into the work. One of the momentous questions which confront the architect and his patrons is the lack of intercommunication and sympathy between them and the art manufacturer—a subject which has of late engaged the attention of leading manufacturers and artists in France. When a good paper is read on some useful subject, few outside the profession know anything about it, or care to know. Those the most directly interested in the trades are left out, and what they learn they are chiefly indebted for the information to the professional press. Many a building artificer and art workman can throw a good deal of light on questions of construction, designing, and manufacture. Take, for example, the manufacture of a piece of furniture—a font or a pulpit. One designs it, another contracts for it, a third makes it, a fourth carves it. A paper is read on the subject by the designer or the carver, but little or no reference is made to those who are actually employed in the execution of the work. In the discussion these working artists are not invited to give their opinion; such a course would be thought unprofessional, and even *infra dig*. The allied trades are in the same condition—they are rarely taken into consultation: the consequence is that each falls into an isolated groove of its own. The same state of things exists to a large extent in France. Some time ago a commission was formed to inquire into the state of the art manufactures and to want of artistic feeling displayed. The delegates representing the various trades were unanimous in attributing the deterioration of the French craftsman partly to the excessive division of labour and to the want of knowledge of drawing. The establishment of technical schools followed this inquiry, in which youths are taught trades professionally, going through a regular apprenticeship, and earning after three years a certificate of proficiency in the trade. Division of labour is abolished, so that in the *écoles professionnelles*, or apprenticeship school, each trade is taught throughout; each part of it is learned. M. Dagny, in his work "L'Enseignement Professionnel des Beaux Arts dans les Ecoles de la Ville de Paris," describes the manner of teaching, drawing, and technical arts. Besides the subjects obligatory at the primary schools, there is the technical course, including smith's work, carpentry, engineering, turning, and carving. Specially-designed articles are set apart for these trades, every pupil spending six or eight hours a day in the workshops, and four hours in the classroom. But the chief point to notice is that each trade is learned throughout—the cabinet-maker, for instance, not only frames, but carves, the woodwork and stuffs the chair; in the design of wall decoration and mechanics the principles of design are based on a study of the material, and the process of manufacture of tiles or wall-paper and tiling.

The art of the future will improve or deteriorate in the proportion in which the tradesmen are skilled in their trades as a whole, or in part. To take, for example, the building artificers, who make a very numer-

ous class in all our great towns. They are now to a large extent mere machines: they can execute only in a material in one way, it may be to lay bricks, to frame timbers, to perform joiners' work; but they have never learned to draw or to design in brickwork, they are ignorant of mechanical construction, or the principles of design in wood. They know nothing of the motive of their work, because they have not learned anything about other trades in connection with their own. One serious defect of the building artificer's education is that he knows nothing of drawing or design in connection with his craft. The masters are not desirous that they should know, so long as they perform a certain operation with expedition. The design is a distinct art, often entrusted to one who is ignorant of the materials or the processes of which he is presumed to be acquainted before he can intelligently treat them. How can the designer in ceramic decoration undertake to make a design unless he knows something of the processes of manufacture, of clay goods, the chemical composition, colouring, and the effects of firing? On the other hand, we contend that we should have better masons, bricklayers, carpenters, and joiners, plasterers and decorators if drawing were a part of the instruction given to these artificers—drawing, we mean, sufficient to enable the workman to describe by geometrical means what he desired to execute. Drawing from models and casts is now taught in the primary schools in France and Germany. To the want of a knowledge of drawing the degeneracy of art workmanship is attributed in France. In this country it is a rare thing to find a workman able to describe by a drawing or sketch accurately any work he may be executing, or even to be able to set out his work himself, without the aid of the foreman or clerk of works. So a want of correctness of eye and hand and ill-considered arrangements are often the consequence of this defect in education. A knowledge of drawing has the further advantage of stimulating the workman to design for himself, thus materially adding to his means and prospects as a tradesman. In the old epochs of art every workman designed his own work, or was enabled to improve upon it. He possessed the faculty of thinking in the material. Now all this is changed: the workman and designer are distinct persons, each ignorant of the other's work, and each desirous of making the world see how incompetent the other is.

The architect stands in the same position with respect to technical knowledge that the workman does as regards design. He knows little of the practical operations necessary in carrying out his designs. We have seen drawings prepared for masons, carpenters, and ironwork that could not be executed as drawn, because the architect had not made himself familiar with the methods adopted in the particular case, or had not understood how the material could be converted or treated. To take, for example, the jointing of a stone spire: it is a question of doubt among architects whether the beds of the stones should be horizontal or inclined; there is more thrust in the latter than in the former case, though practical masons prefer the latter plan of right-angle beds as being stronger, as every ring of stones is firmly seated and cannot slide, if the necessary courses of bond stones secured with dowels are inserted. The use of unprotected iron is shown in a drawing, in spite of all experience of the necessity of avoiding it in stone construction. Such a matter as the weathering of a sill, or the construction of the bottom rail of a casement and frame, is very simple, but one that requires technical knowledge. In plans and details for ironwork the architect is constantly in need of practical advice; his general acquaintance with construction and stresses

help him little in designing the connections, and in giving the details to the engineer or founder, who is often better able to supply them. Again, in the design or specification for plumbing or drainage work, the need of practical knowledge is felt. The architect must be well up in the systems in use, and must know new appliances, and as a matter of fact this kind of detail can only be learned by knowing what has been done and by consultation with those who have made the subject a special study. Very few in practice can write practical specifications for heating and ventilating a building, or for an electric lighting installation, although they are subjects which are now incorporated with the functions of an architect's services.

The specification of materials is one of yearly growth, requiring a larger amount of general scientific and technical knowledge than our ancestors could have imagined. Take building stones. The Select Committee appointed to inquire into the stone to be used for the Houses of Parliament was the first English scientific investigation. Before that time any practical application of science was considered beneath the attention of the geologists. The old masons possessed, nevertheless, a practical knowledge of the stones they employed; they were acquainted with the best quarries and beds, and their work attested discrimination. Our higher scientific knowledge has not shown better results. Masters of practical masonry, they learned more from the quarries and the buildings they saw and worked upon than from books; their acquaintance with material was chiefly derived from actual experience from working upon the stone. But beyond the intimate knowledge thus acquired, the masons formed a brotherhood or fraternity, and by this means advice and aid were sought when needed, and the experience and practical knowledge of generations were thus made available, and brought to bear upon any given work—an agency for utilising practical experience unknown to us.

## COMPENSATION ON COMPULSORY SALE.

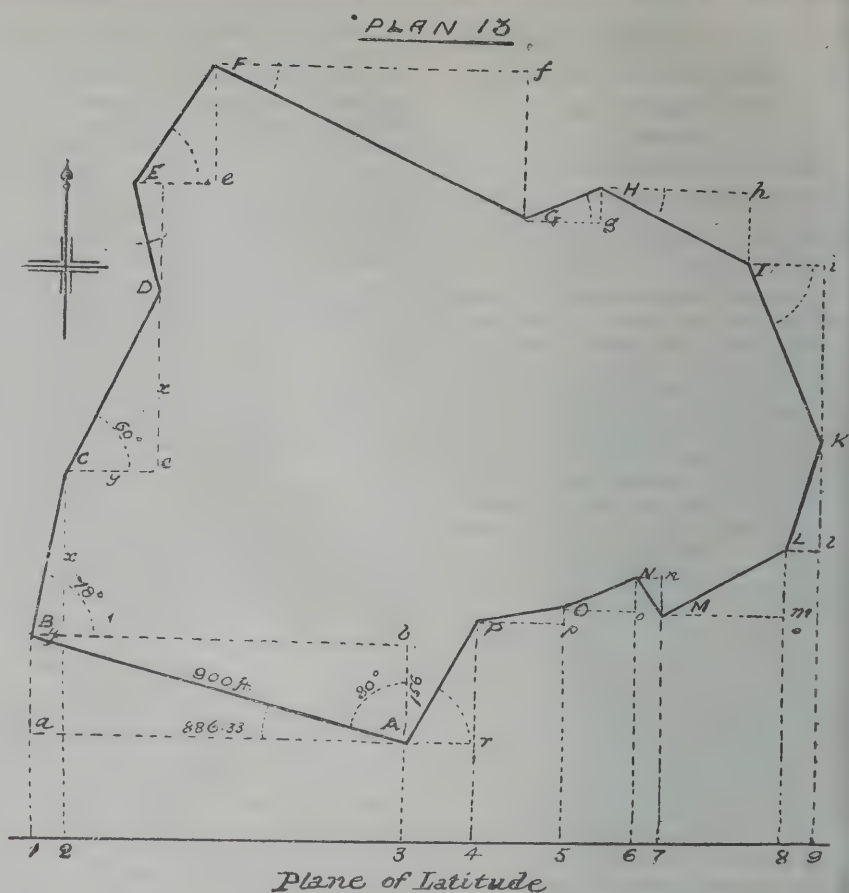
WHERE there is any probability of land being required for public purposes, and so coming under the law as to compulsory sale, it is natural that its owners should set about increasing its value to their own advantage. Even without such a probability, if the land is in a good position it would be foolish to leave it idle, and not to take such steps as would heighten its selling price upon the happening of any emergency. But when the damages come to be assessed upon a compulsory purchase under Parliamentary powers, the question will certainly arise as to the basis upon which compensation is to be calculated, or, in other words, as to the measure of damages. This is what occurred in the recent case of *ex parte* "The Streatham and General Estates Company (Limited)," (*Times*, August 9), which was taken up to the Court of Appeal after the refusal of a Divisional Court to grant a rule for a *certiorari* to reopen the award of a jury and the High Bailiff of Westminster as to the amount of compensation payable. The ground for seeking to go into the matter over again was that the High Bailiff had wrongly excluded a certain head of compensation claimed by the Company from the consideration of the jury. From the facts proved, it appeared that the Company had bought an interest in certain land near the Royal Courts of Justice in London in June, 1884, which land was held for a term under heavy ground rents. The Company, however, set about improving the value of the property, and with this view they entered into negotiations with the Commissioners of Works as to straightening a path adjoining



the land; and subsequently proposals were made by some large brewers to take a piece of the land as the site for a new publichouse. In 1887, however, the Bankruptcy Offices Sites Bill was passed, and in September of that year the company received from the Commissioner of Works a notice to treat for the purchase of the land in question.

Under this notice, as the parties could not agree, an inquiry was held before the High Bailiff of Westminster and a jury, to assess the compensation, in June last. The witnesses called for the company put the value of the land at about £35,000. The company proved that they had expended £18,000 on the property since they bought it, this sum including the cost of the land, the ground-rent paid, the outlay in improving the property, and the costs of surveyors, solicitors, &c., incurred with that object. The High Bailiff, however, told the jury that they were to give the value of the land and 10 per cent. for compulsory purchase, and were not to take into consideration the expenditure of the company, which might, at some future time, and if the notice to treat had not been given, have made the land remunerative. The jury assessed the value of the property at only £6,000, and therefore the company sought to set this award aside on the ground that the High Bailiff ought not to have excluded from the consideration of the jury the items making up the £18,000. Lord Chief Justice Coleridge and Mr. Justice Denman had refused to interfere; and now the Master of the Rolls and Lord Justices Lindley and Bowen concurred with them in holding that the view taken by the High Bailiff was correct. The argument on behalf of the company was that their outlay upon the land had not fructified, and unless it were taken into account by the jury, the company would lose all the benefit anticipated by the expenditure. The notice to treat at once prevented the company from completing their contract, and making the land more valuable. The jury ought, therefore, to have taken this expenditure into account, although they were not bound to give any compensation in respect thereof. The expenses thus thrown away ought to have been considered in assessing the damages under the phrase in the Lands Clauses Act, 1845, as to "damage by reason of the execution of the works," and so the award should be reopened, and a fresh inquiry held by a jury properly directed as to the rules they should follow.

The Master of the Rolls held that the whole thing came to this: that the company, not being able to say that the jury had not given the whole value of the land, insisted that they were entitled to something more. Their proposition was, in fact, that over and above the full value of the land, the company could claim some or all of the items contained in the £18,000. But these items consisted of expenses incurred by the company in acquiring the land, and in converting it from its then condition into valuable building land. He considered that these items could not properly be taken into account. As to so much of the expenditure as had fructified by converting the land into building land, the company had got that by getting the present value of the land; and so the High Bailiff had been right in his ruling. Lord Justice Lindley put the points even more plainly by stating that the High Bailiff did not exclude any evidence at all. He allowed it all to be given, and it was heard by the jury. But when they came to consider its effect, and to give their verdict, he rightly told them to award the value of the land having regard to the whole evidence before them, but not to take into account the speculation entered into by the company. Such a claim could not, in the opinion of the Lord Justice, be got in under any words in the Land Clauses Act quoted. This way of putting it as a speculation by the company to increase



the value of their land, and which fell through because the notice to treat stopped all progress in that direction, seems summarily to dispose of the whole contention. But the case is important because of its general application to similar claims. If the actual value of the land at the time notice to treat is given can only be recovered, with 10 per cent. for forced sale, then there is not much encouragement to speculate with a view of making out a prospective value for the purpose of claiming compensation upon that basis. In this case the result was a loss to the parties speculating, because the money they had expended in improving their property had not had time to fructify before the compulsory sale under Parliamentary powers. It is obvious that any plan of making up a value for land that may afterwards come to be taken for public purposes is too risky to be reliable, and in the face of this decision of the Court of Appeal the chances of its success are now greatly diminished.

#### LAND SURVEYING.—XI.

##### TAKING ANGLES AND TRAVERSE PLOTTING.

HAVING given our student readers an idea of making a traverse survey of a town by taking the circuit of its walls or streets, we may now explain in more detail the manner of setting up the theodolite and adjusting it at each station. Again referring to our plan given last week, let us suppose the stations have all been selected and the poles fixed, and the instrument fixed at A. The first thing to do is to loosen the compass-needle and let it settle to the magnetic north. Clamp the vernier plate to the limb of instrument at zero and  $180^\circ$ , then loosen the lower clamp and turn the instrument bodily round until the zero point coincides with the magnetic north. The observer is now in a position to take the angle or the bearing of the line A B in relation to the meridian. To do this, loosen the vernier plate and turn the instrument round on station B, complete the bisection of

the foot of the pole by means of the tangent screw, and read the angle which A B makes with the magnetic meridian and note the angle in the book. At point, as line A P can be taken, again loosen the vernier and turn the instrument on P, perfect the bisection as before, and read off the angle with the magnetic. Note this angle. Should there be any other object in the field that can be seen, and is a good mark, turn the instrument to it and fix its position, noting the angle, and make a record of the object observed. After these observations turn the vernier plate back on station B, see that it reads as before, after perfecting its bisection at the foot of pole at B. You may observe here it saves labour and error in taking readings to avoid fractions of minutes, by adjusting the vernier to some division on the limb of a definite number of minutes, say 10, and having the pole re-adjusted accordingly.

The instrument is next removed to station C, being fixed exactly over the hole in which the pole was driven. Level and adjust the instrument, then release the under clamp and turn the instrument round to bear on station A. It is simply reversed, and as the vernier has not been touched, there is no interference with the last angle. Perfect the bisection by means of the slow-motion screw. By thus reversing the telescope the instrument is placed in the same position relative to the magnetic which it had when at station A. Having perfected the bisection at the bottom of pole A, loosen the clamp and turn the instrument to bear on pole C; tighten the clamp, perfect bisection with tangent screw, and read the angle. The theodolite is then removed to station C, previously to which the line B C is chained. It is again leveled, the lower clamp is loosened, and the telescope reversed to read back on pole A; tighten vernier plate and perfect bisection of cross-hair as before. Again loosen the vernier, reverse telescope, and turn the vernier plate round to the next pole D; tighten the clamp, perfect the bisection as before, and read the angle. The same operation is repeated at stations E, F, G, H, I, K, L, M.



and P. At every station the operation of passing the lower clamp and reversing the telescope to bear on the back station is gone over, and the verniers read off to see there has been no alteration. Suppose we have arrived at the last station, P. If the angles and lines have been correctly taken, it is evident that the angle PA should be equal to the first observation made, A.P. If it is not, then the closing angle does not agree with the first, then the minutes of deviation, not serious in amount, can be divided over the whole of the angles; or, if great accuracy is demanded, the only plan is to work back to the previous stations to find out the error.

Having referred to the system of plotting traverse by tables, we now give an example of laying down a plan such as that we gave in our last article. Again the student should remember that the verticals such as A b, B C, in 13, are "departures" or sines, and all horizontal, such as B b or C c, latitudes or cosines of the angles to be plotted. As we have hinted, all the departures can be conveniently plotted from a plane of latitude, in the same manner as a section is plotted from a datum line. Before the plotting is begun it is useful, and will save error, to make a small scale plan by means of a protractor. To refer to plan 13, it will be noticed that through every angle vertical and horizontal lines are drawn; in other words, that every side of the plot is the hypotenuse of a right-angled triangle, so that if the base and perpendicular from each point are drawn to scale by aid of traverse tables, the hypotenuse will be equal to the measured distance. For example, begin at station A, by drawing lines A b, b c. The angles and lengths of each side have been booked and entered one under the other. Angle A, after deduction from 90°, is 80° from the meridian, and the length of side A b being 900ft., its exact position and length can be found by looking at the traverse tables. A b, or the sine, is found to be 156ft., and b B, the cosine, 886.33ft. A line drawn between the points A and B will give the side required in direction and length. At station B the angle read is 12°, which, deducted from 90°, leaves 78° as the angle required. Looking at the traverse table, set off the horizontal or latitude equal to y, and the vertical or departure equal to x, then the line can be drawn in direction and length. At C the angle is similarly found to be 60°, and the vertical and horizontal having been set off, the line CD can be drawn at an angle of 60° with the plane of latitude. In this way all the angles and sides can be plotted. To save labour, all the verticals can be laid off from one line or the plane of latitude; this is done by adding the distances 156, B to C and so on to D, the departure from a to D can be obtained, and from a meridian line through the distances B y C c can be plotted. This will be evident from an inspection of the plan. The line 19 represents the plane of latitude. The figures 1-2, 2-3, 3-4, 5-6-7, 8-9 represent various distances of latitude which can be laid off by a scale, and through the points verticals can be erected through every angle.

# CARPENTRY AND JOINERY.—V.\*

## ROOFING (continued)—HIPS.

SINGLE lines are used in the majority of the diagrams in this chapter. Lay down a plan of the end which is to be hipped (it may be convenient to lay it down one-half or quarter full size), as is seen in Fig. 31, consisting of the lines of wall-plates (outside measurement), and also lines drawn from external angle where the wall-plates meet at the ridge to the centre of the end of ridge; these diagonal lines are the ground-plan lines of hip-rafters. A line is shown midway between wall-plates, which is the line of ridge; where it

meets the diagonal lines would be the position of the last pair of full-length common rafters. The lines forming the upper triangle of the figure indicate a pair of common rafters and a level line across wall-plates.

Fig. 31 b shows how to proceed to use the lines obtained in order to get length of hip-

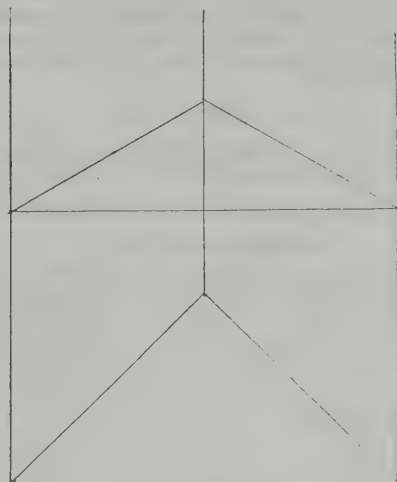


FIG. 31

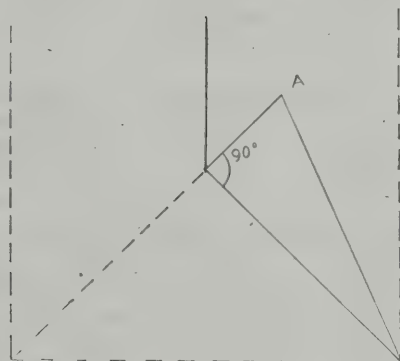


FIG. 31b

rafter, and also top and bottom cuts. From the point where the diagonal meets the end of the ridge, draw a line at right angles (square) to the diagonal, and make this line in length equal to the height of the roof (that is, perpendicular height—see upper part of Fig. 31 or Fig. 17), join this to the angle of the wall-plates, and parallel to this line, and at the

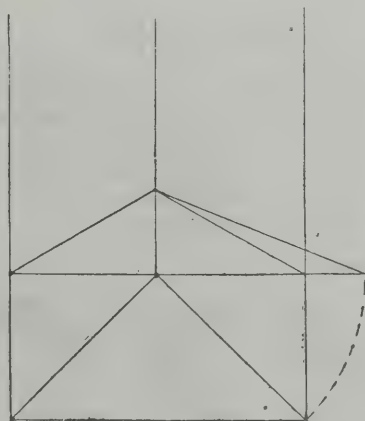


FIG. 32

distance of the breadth of hip-rafter draw another line, when the top and bottom cuts will be seen. If this triangle were supposed to be hinged along the diagonal line and raised from its horizontal position to a vertical one, the point A would just meet the end of the ridge of the roof where the last pair of full-length rafters meet. Be sure to grasp this idea,

A small piece of cardboard, used for laying down the lines by way of experiment, and cutting the two sides of the triangle which meet in the point A, and bending it to the vertical along the diagonal, would give the operator the matter fully.

Fig. 32 gives another method of getting length and cuts of hip-rafter. The plan of one end of the roof is seen, as also a pair of common rafters; the line drawn parallel to the end wall-plate, and through the meeting-point of diagonals and ridge in plan is the position of the last pair of common rafters, and in the figure is also a horizontal (level) line across wall-plates, and is continued on the right-hand side to meet the diagonal swung round with the meeting-point of ridge and diagonals as a centre. A line drawn from this point to the ridge gives the length and cuts of the hip-rafter; set off from this line a distance equal to the breadth of hip-rafter, and this so far is complete.

To get the "backing" of the hip-rafter readily in practice, take a short piece, 3in. or 4in. wide by the thickness of hip-rafter in thickness; cut the end of it to the bevel of the bottom or foot-cut of hip-rafter, as above obtained; then place it upon the wall-plate at

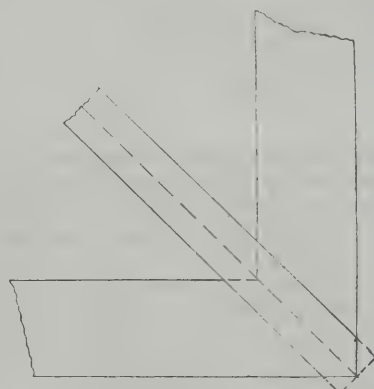


FIG. 33

the angle where the hip-rafter is to rest (see Fig. 33).

Now, it will be seen from the above figure that if it is placed so that the outer edges meet the outer edges of the wall-plates, the centre is a little back from the external angle at the junction of the side and end wall-plates. Now bring it forward, as shown by the dotted lines, until the centre of the piece (hip-rafter) just meets the external angle above



FIG. 34

stated, and with a pencil, running along the wall-plates and underneath this piece, mark what it (the hip-rafter) projects beyond the line of wall-plates at its outer edges (1/4 in. or over it may be) pare this off with a chisel square from the foot-cut—that is, the stock of the square is applied to the foot-cut of the piece (hip-rafter), and the blade stands up. When this is done it will be seen how much is to be taken off along each side, and by running a gauge or pencil line on, along each side, and also up the centre of the edge, then planing off to these lines, the hip-rafter is backed. This method is suitable also when the wall-plates form the acute or obtuse angle. Different

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methods are adopted for fixing the hip-rafter at the top: it may terminate against the ridge itself, and will then require to be cut (in plan) V-shaped, the reverse of how the backing of the hip makes it at the wall-plate angle. Sometimes a piece of lin. board is nailed against the last pair of common rafters and end of the ridge, and the hip-rafters abut against this and mitre with each other, half their thickness. The cuts in such case would correspond with those in Fig. 34, which shows also the method of getting the raking cut of jack rafters (creepers).

It is simply turning the hip down, as if it were hinged at the wall-plate. The guide will be the length of the centre rafter, which is exactly equal to one of the common rafters when it is a true square hip. The bevel for the raking cut is seen. The other cuts of the jack

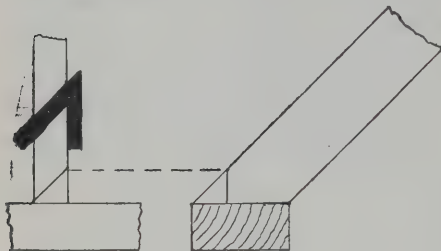


FIG. 35.

rafters (creepers) are similar to those of the common rafters. When the proportion between any two consecutive jack rafters is obtained the others will differ in length in the same proportion; that is, if the difference between the second and third "jacks" from the centre is, say, 16in., then each succeeding jack will be 16in. shorter than the one nearer the centre and next to it; and also there are four jack rafters of any given length in the formation of a true hip. Another readier method in practice of getting the raking cut of the jack rafters is shown in Fig. 35.

Having got the foot (bottom) cut of the rafter, measure from the point (toe) along the

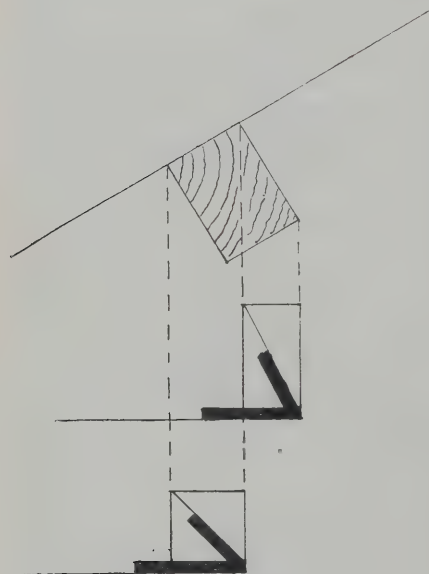


FIG. 36

foot-cut the thickness of the rafter, and square up a line as shown; then from where this meets the upper edge of rafter to point (toe) on opposite edge of rafter draw a line, set the bevel to this (a line parallel is shown higher up the rafter in order to have room to show the bevel fully), and you will have the raking cut of jack rafters. This will also suit roofs the wall-plates of which make other angles than right angles at their corners.

Fig. 36 shows what is a very important matter—the getting the cuts for the end of the purlin, in order that it may fit against the

hip-rafter; the method shown is very simple. The cut in each case is the diagonal of a rectangle having two of its sides the plan of side or edge of the purlin when at the inclination it is to have on the roof, and the other two sides the full width of side or edge; projectors are drawn from the corners to show how the plan of a face or an edge is obtained, and actual measurement gives the width of face or edge. There need be no difficulty in understanding this method; it obtains the same results as more complex ways of going about this matter do.

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XVII.

By HENRY LOVEGROVE, F.S.I., Surveyor.

### CARPENTER.—ABSTRACTS.

Superficial.	Cube.	Cube.
Centring to segmental aps., &c.	8 8	Fir-framed in roofs, floors, and partitions.
10 11 Ddt.	16 9	
16 2 1 0	1 5	374 9
2 4	1 2	44 3
1 11	3 9	38 10
31 4	1 0	189 4
Do. for circular do.	1 6	12 1
26 0	16 2	77 8
To tr.	1 8	13 1
33 4	8 11	3 9
	62 6	753 9
Run.	Cube.	Planing on fir.
T. per 4½ soffit.	Fir-framed in trusses.	2 0
15 0	9 10	78 8
6 0	Notch for key-stone.	10 0
11 0		90 8
5 0		
37 0	2	

¾ sawn boarding for roof.	4,322 6	lin. gutter boards.	66 0	Wood-blok, paving and laying.	2,567 2
200 0		Deduct.	70 0	Run. Circular cutting on ditto.	42 0
2,392 10			121 2		
6,915 4			191 2		
Battening for vertical tiling.	100 0	Inodorous roofing felt, and allow for waste, &c.	4,322 6	F. E. springer.	20 0
2in. Wrought and framed ridge.	52 6		200 0	Chimney gutters, brds. and bearers.	20 0
36 9			2,392 10	Wrought and cut ends to 4½ by 2½ rafters.	
55 6			6,915 4		
11 3			191 2		
156 0			Run. Raking cutting on lin. gutter boards.		
			6 0		

Deal joint slips.	96	Fir framed wrought.	2in. deal rounded roll.	2 rebated oips.	4
96		cleats for purlins out of 6in. by 4in., and 9in. long.			
16					
24					
32					
16					
48					
8					
16					
16					
16					
384					

Frames.—Run. 4 by 3 fir-wrought frmd, rebated, and beaded frame.	264 0	Do. moulded.	66 0	4in. by 3in., wrought framed, dble rebated and beaded transom, mullion, &c.	34 0
285 0		Do. do. cir., including all joints for plaster.	34 8		126 0
31 8			6in. by 4in. wrought and framed.		16 0
42 0					176 0
100 0					
38 9					
18 6					
70 0					
849 2					

2in. deal moulded sashes in small square and wide sash-bars.	47 3	Do. hung on butts.	125 0	2in. moulded cir. casement in wide moulded bare hung on centres with cut and moulded beads measur square.	20 3
			242 0		
			22 11		
			22 6		
			412 5		

1½in. four-panel bead butt and square door.	67 6	2in. moulded and flush half-glass door, the lower part in 4 panels, the upper filled in with wide sash-bars forming small squares.	136 6	2in. three-panel moulded both sides door.	84 10
1½in. moulded and squared 3-panel door.	33 0		21 0		104 6
			157 6		139 4

1½in. wrot, tongd. and moulded window board & bearers.	24 0	lin. wrought one side and beaded boarding.	100 0	1½in. wrought and framed jam linings and backings.	23 3
38 0		lin. wrought one side and tongued boarding as ceiling.	721 8	1½in. wrot. fram and double bated jam linings.	24 0
4 0			110 6		
7 4			832 2		
73 4					

Groove for plaster.	216 0	2½in. by 3in. wrought, played, and rounded fillet as architrave, including mitres.	178 8	2in. splayed on lin.	17 0
237 0		32 0 Rd. ends to door.	195 8	Deal wrought do stop planted 2in. by ½in.	29 6
23 8		99 0	8		93 0
44 0		16 0	8		122 6
520 8		7 0	12		3in. by lin. wr and chamfer fillet.
Stops.	4	191 0	8		72 0
24			2		24
4			38		
Runs. R. C. and waste on lin. wrought one side, tongued & beaded boarding.	28 0				

3in. by lin. wrot, framed, splayed, and beaded grnds.	65 8	lin. wrot. framed jamb lining, 4in. wide & backings.	96 0	4in. by lin. wr one side, fillet in splayed edge.	72 4
98 6					
164 2					

8in. by lin. wrot one side, eaves fascia, splayed 1 edge.	259 6	2in. by 2in., wrought, rebated, and moulded frame for iron casements.	116 0	Small deal moulded on lin. and framed bar boards.	89 4
			154 0		
			270 0		

Moulding out of 4in. by 3in. and fixing as part of cornice.	82 0	lin. wrought, one side fascia, cut and fitted between rafters 6in. wide.	72 4	9in. by 2in. wrot and framed bar boards.	15 0
2 spid. S.E.	2			Out ends to do.	2

6in. by lin. wrot one side, fascia plugged to walls.	84 9	Moulding out of 3in. by 2in. planted on transom, &c.	13 0	Mitred and returned ends.	12
Numbers.—Notched and returned rounded ends to 1½in. window boards.	24		15 0	Returned mould ends.	2
4			2 3		8
8			15 0		12
4			45 3		2
40					36

6in. by 6in. wrot. framed post, &c.	90 0	Run. 4in. by 3in. wrought, framed, rebated sunk weathered sill, grooved for window board.	34 0	Three circular r forming arcadi wrought, fram and pinned w oak pins, out 2ft. 9in.	2ft. 6in., incl ing all headi joints.
108 0			55 0		8 do. cut out
198 0			5 8		3ft. lin. by 2ft. 4
			8 0		16 do. cut 4ft. 2 by 2ft. 4in.
			102 8		4

IRONMONERY, WITH SCREWS AND FITTINGS.					
Pairs 3in. butts, 6 mortise locks with brass furn.	12	7 do. white china furniture.	2	Sets of plain br finger-plates, o long and o short.	7 sets of wh china finger plates.
24			6		4
2			4		12
4			4		16
2			4		
6			5		
56			5		
Do. 3½ do.	10½		5		
Small barrel bolts.	4		2		

Pairs of brass sash centres.	4	Brass lever case-ment fastener.	24 do.	Run.—Gabled in tongue, bedded white lead, a grooved in oak a terra-cotta.	34 0
Perforated zinc panel, and fixing in ceiling 3ft. by 3ft.	6		2		58 0
			38		8 0
			38		102 8
Japanned iron lever casement fastening.	4	Eisley's patent opening for iron casement 13ft. from floor.	12	Iron dowels a runs in fir a stone.	8 in oak and ter cotta.
Do. do. stays.	4		12		12
			4		28



Boyle's patent Sets of lines, pul- Pieces of hoop-  
(ventilators) air- leys, &c., to open iron nailed to oak  
pumps and fixing and shut case- posts built into  
on roof, including ment 2ft. 6in. from wall about 1ft. 6in.  
all cutting to tile, floor. long.  
flashing, & trim- 4 12  
ming on rafters.  
6

## DIMENSIONS (CONTINUED).—PLASTERER.

	ft. in.	ft. in.	
13 0	13 0	169 0	L.P.F.S. and twice W. ceiling.
13 0	13 0	169 0	Rooms Nos. 1 and 5.
15 3	11 9	179 2	Add No. 2.
3 6	13 0	45 6	Add passage.
4 9	4 0	19 0	Add.
4 0	3 0	27 0	Add over stairs.
4 0	7 0	28 0	Add linen.
3 9	2 6	9 5	
10 6	4 0	42 0	Add landing.
4 0	10 6	7 6	Add No. 3.
7 6	13 0	12 0	Add No. 4.
15 3	15 3	7 8	Add passages.
6	13 6	6 9	
190 6	5 6	1047 9	L.P.F. and S. and twice C. sloping part of roof.
2	7 6	22 6	
1 6	5 3	1 0	Deduct do. chimney breasts.
1 0	7 9	1 0	
2	63 10	2 9	R.F.S. and twice C., Nos. 1 and 5 above dado.
2	8 0	2 9	
4	16 0	2 9	R. F. S. and twice C., walls and gables.
4	1 2	2 9	
32 0	2 9	316 9	Add chimney breast.
2 9	14 6		Add No. 2.
30 6	2 9	20 0	L. P. F. B. and twice C. partition in No. 2.
14 6	2 9	123 9	
15 3	5 6	83 11	Add passage.
16 3	2 9		R.F.S. and twice C. in passage.
2 9	3 0	65 8	Add at end.
2 9	2 0		
2 9	3 0		L.P.F.S. and twice C. partition at end of passage.
18 9	2 9	162 11	Add passage next linen room.
16 0	2 9		
10 6	2 9		Add do.
9 0	4 9	26 2	Add.
5 6	10 0	27 6	Add in side linen room.
8 6	2 9	23 5	
2 9	3 6	9 8	R.F.S. and twice C. end of passage next linen.
5 9	5 6	31 8	R.F.S. and C. in linen room.
8 0	2 9	22 0	Add do.
2 9	24 9	68 1	Add next stairs.
12 0	10 0	480 0	Add walls each side of stairs.
2 9	2 9	15 2	Deduct do.
2 9	7 0	168 0	Deduct do. for opening.
3 0	1 0	12 0	
11	5 6	10 1	Keene's Ct. narrow and (4).
5 6	5 6	22 0	Labour rounded angle to do.
11	8 0	14 8	K. Ct. narrow cir.
8 0	8 0	32 0	Labour cir. round angle in K. Ct.
			4 M. 8 S.E.

	ft. in.	ft. in.	
14 3	5 6		L.P.F.S. and twice C., partition outside No. 5.
13 0	5 6	258 6	Add passage.
19 9	6 6		Add No. 3.
2 0	2 6	5 0	Deduct do.
26 3	5 6	144 5	Add No. 4
21 0	2 9		
8 9	2 9		R.F.S. and twice C., No. 3.
13 9	2 9	2 6 0	Add No. 4
16 6	2 9		Add.
14 11	2 9		
9 0	6 3	87 6	Dubbing out to form cir. corner 14in. gt.
14	5 6	50 0	Ex. Ir. only forming cir. in plastering 14in. gt.
14	2 9	38 6	Add.
			10 S.E.
			14 Do. in sp'ay.
4	5 6	22 0	K.Ct. and rrd. angle.
4	2 9	11 0	Add.
2	5 6	11 0	Add.
			10 S.E.
			DADO.
2	71 10	3 6	502 10 K.Ct. dado and (4) Nos. 1 and 4.
10	3 6	35 0	Labour forming cir. corner, 14in. gt.
			10 S.E.
	18 3	3 6	63 11 K.Ct. dado, and (4) in passage.
	18 3	3 6	63 11 Do. on lath.
	30 6	5 6	106 9 Add No. 2.
	32 0	3 6	112 0 K. Cement on brick dado and (4) No. 2.
	3 6	21 0	Extra labour forming circular corner 14in.
			6 S.E.
	58 0	3 6	98 0 K. cement dado on brick and (4) passage and landing.
	8 0	2 0	16 0 Add extra heights next stairs.
	51 0	3 6	119 0 K. cement on lath dado and (4).
	14 6	3 6	50 9 Add in linen.
	3 0	3 6	10 6
	19 3	3 6	67 5 K. cement on brick dado and (4) linen.
	21 0	5 6	73 6 Add No. 3.
	19 6	3 6	68 3 K. cement on lath and (4) dado in do.
4	3 6	14 0	Extra to forming circular corner 14in. girt in K. cement, as before.
			4 S.E.
	19 0	3 6	66 6 K. cement on lath dado and (4) landing.
	29 0	3 6	101 6 K. cement on brick dado and (4) No. 4.
	27 1	3 6	94 10 Do. on lath and (4).
4	3 6	14 0	Extra to circular corner as before.
			4 S.E.
	14 0	3 6	49 0 K. cement dado on lath and (4) passage.
	14 0	3 6	49 0 Do. on brick and (4) in do.
10	3 6	35 0	Extra to round angle in K. cement.
			10 S.E.
2	71 10	143 8	Extra to forming bold flush-board at top of dado (No. 1 and 5), K. cement.
10	1 6	15 0	Deduct do.
10	1 2	11 8	Circular do.
			4 Extra labour to rounded angles.
	36 6	36 6	Extra to bold flush board as before passage.
	62 6	62 6	Add No. 2.
6	1 6	9 0	Deduct do.
6	1 2	7 0	Cir. do.
	62 0		Extra to bold flush bead as before landing.
	36 9		Add linen.
	40 6	139 3	Add No. 3.
4	1 6	6 0	Deduct do.
4	1 2	4 8	Cir. do.
	19 0	19 0	Extra to bold flush b.d.
			2 S.E.
	56 9	56 9	Extra to bold flush bd. No. 4.
4	1 6	6 0	Deduct do.
4	1 2	4 8	Cir. do.

	ft. in.	ft. in.	
	28 0	28 0	Bold flush as before passage.
2	71 10	143 8	6 Extra to rounded angles.
			Extra to flush bd. in K. Ct. to form skirting in dado.
10	1 6	15 0	Deduct do.
10	1 2	11 8	Cir. do.
	99 0	99 0	Extra to flush bd. as last.
6	1 6	9 0	Deduct do.
7	1 2	7 0	Cir. flush bd. as skirting.
	139 3	139 3	Extra to flush bd. as before.
4	1 6	6 0	Deduct do.
4	1 2	4 8	Cir. do.
	28 0		Extra to flush bd. as before.
			10 Extra to round angles in do.

## GROUND FLOOR.

	ft. in.	ft. in.	
2	36 0	25 0	18 10 0 L.P.F.S. and twice W. ceiling wings.
2	16 0	14 0	448 0 Add nurse's room.
2	24 0	18 0	864 0 Add wards.
2	5 10	1 9	20 5 Deduct do. for chy. breast.
4	5 10	1 2	27 3
2	3 0	3 0	18 0 Deduct for stairs.
2	110 4	9 0	1986 0 R.F.S., and twice C. wall wings.
4	10 0	7 6	300 0
12	9 6	114 0	Dubbing out to form cir. corner, 14in. gt. as before.
12	9 6	114 0	Ex. to forming cir. corner in plastering 14 gt. as before.
			12 stops.
			12 do on sp'ay.
4	9 6	38 0	K. Ct. rounded angle.
2	62 4	7 0	872 8 R.F.S., and twice C. nurse's room.
2	86 4	7 0	1208 8 Add boards.
24	7 0	168 0	Dubbing out to form cir. corner, as before.
24	7 0	168 0	Ex. to forming cir. corner in as before.
			48 S.E.
8	7 0	58 0	K. cement rounded angle to chimney breasts.
			8 S.E.
2	18 0	3 9	135 0 R. F. S. and C. to sinks.
2	16 6	3 9	123 9 Add w.c.
2	5 6	10 9	118 3 Half-brick wall in cement.
2	3 6	5 6	38 6 L. P. F. S. and twice W. ceiling.
2	2 9	5 6	30 3 Add w.c.'s.

## CHIPS.

A new church of St. Luke is about to be commenced at Kingston-on-Thames. Messrs. Kelly and Birchall, of Westminster, are the architects, and the tender of Mr. W. H. Gaze has been accepted at £3,600 for the first section of the works.

St. Matthias Church, Salford, built in 1842, was reopened on Sunday, after having been restored. The whole of the windows, which are of diamond type, placed in the church at its consecration, have been reglazed in rolled cathedral glass, a work executed by Messrs. R. B. Edmundson and Son, of Manchester. The church has also been repainted and decorated; these works have been carried out by Mr. W. G. Sutherland, of St. Ann's-street, Manchester.

A new highway bridge has just been erected at Tregate, connecting the counties of Hereford and Monmouth, from plans by the surveyor for the former county. Mr. Charles Miles was the contractor.

A new mission church of All Saints is being built for the Roman Catholics of Anfield, near Liverpool. It will comprise schoolrooms for 480 children on the ground floor, and a church seated for 500 persons above. The materials are local grey brick, with red pressed brick for angles, jambs, and strongmolds, and red stone for copings, sills, and other dressings. The contractors are Messrs. Urmson, of Liverpool, and the architects are Messrs. J. and B. Sinnott, of Harrington-street, in the same city. The probable cost will be about £4,000.

A new Constitutional Club is in course of erection at Watford, at the Corner of High-street and Clarendon-road. The building is Queen Anne in style, and will be built of red bricks, with dressings of terracotta and Monks Park stone. Mr. W. H. Syme, of Watford, is the architect, Messrs. T. Turner and Co. are the builders, and Mr. Henry Allen is the honorary clerk of works. The outlay will be over £2,000.



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## ILLUSTRATIONS.

LANCASHIRE AND YORKSHIRE BANK.—TWO DUTCH RENAISSANCE CHIMNEYPICES.—ROYAL NAVAL COLLEGE CHAPEL, GREENWICH.—BRISTOL CATHEDRAL.—COTTAGES FOR THE OXFORD COTTAGE IMPROVEMENT SOCIETY.—SKETCHES OF DECORATIVE FURNITURE.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## LANCASHIRE AND YORKSHIRE BANK, LIMITED.

WE give a view of the main front of the premises of the above bank now in course of erection at the top of King-street, Manchester, by Messrs. Heathcote and Rawle, architects, of Princes'-street, Manchester. The view shows the adjoining building of the Commercial Union Assurance Company, erected some few years ago by Mr. Heathcote. The new building has a base some 6ft. high of grey Dalbeattie granite, the remainder of the front being in stone from the quarry of Mr. Drabble, Matlock Bridge. The interior of the banking chamber will be finished with linings of rouge, jasper, and other marbles, the woodwork being in oak. The basement is entirely lined with Burmantofts ivory white glazed bricks. The principal strong room has walls, floor, and ceiling of compound steel, backed by 5in. steel rails fixed close together, and the whole outer-cased with 18in. of concrete formed of special materials. The basement contract has been carried out by Mr. Hodgkinson, and the superstructure has been given to Messrs. Neill and Sons, all of Manchester. The bills of quantities have been prepared by Mr. George Paton, and the clerk of works is Mr. Bennett.

## TWO DUTCH RENAISSANCE CHIMNEYPICES.

WE draw attention to-day to a valuable collection of geometrical details and general views now in course of publication in small folio form by Herr von E. A. Seemann, of Leipzig, under the title of "Die Renaissance in Belgien und Holland," by Franz Ewerbeck, professor at the Royal Polytechnic School at Aix-la-Chapelle, assisted by Alb. Neumeister, architect at Meiningen, by Henri Leeuw, professor of technical art at Nymegen, and by Emile Mouris, an architect in Brussels. By special permission we are enabled also to present our readers with two specimen plates slightly reduced from the originals, and arranged side by side in our double-page photo-lithographs. No better recommendation could be offered than such examples as these, and they at once afford good evidence of the artistic manner and practical thoroughness with which the authors have invested Herr Seemann's publication. The letterpress descriptions accompanying the plates are occasionally enriched by small plans, and are printed in French as well as German, thus enhancing their usefulness. Some of the lithographs are printed in two tints, or in colour, as in the pages devoted to old Dutch tiles, while many sheets are executed in chalk lithography. Turning to the two Renaissance chimneypieces chosen for our accompanying illustration, the first is from the "Salle d'Audience" on the first floor of the House of von Marten van Rossum, General of Duke Charles de Geuldre, at Zalt Bommel. Mr. P. J. H. Cuypers, of Amsterdam, restored the building,

which is one of the most picturesque examples of the Renaissance existing in Holland, and though the house is not by any means a large one, it contains an uncommonly quaint staircase, and some more than ordinarily good details, such as the sculptured fireplace jambs, representing Adam and Eve, to the room on the left of the entrance hall on the ground-floor. Herr Weve, of Nymegen, contributes a good chalk drawing of these figures, which are admirably carved. H. Leeuw has drawn the chimneypiece, which we illustrate. It is a neat specimen of the Early Renaissance, with elaborately-detailed columns supporting the corbels which carry the hood. The inclosed space forming the front of the fireplace is faced with blue tiles having large panels of Delft representing David and Solomon, the latter being the better of the two figures. The angles of the house from which these are taken are marked by circular turrets crowned by conical spires, with stepped gables at the ends of the main roof. The semicircular window heads are carved very nicely, and the lower portion of the windows have the typically diapered wooden shutters so common in Holland. The centre feature of the street façade has been removed, and the openings filled up with plain brickwork. Mr. Cuypers has added a very quaint and original *fiche* to the staircase turret at the rear of the house. Zalt Bommel, 30 miles S.W. of Arnheim, on the left bank of the Waal in Gilderland, is a curious old town, with two churches and several picturesque houses, some of which are given in the drawings before us. In the same part carefully-drawn details are arranged of the great pulpit in the Johanniskirche in Herzogenbusch, with a general plan of this cathedral. The chimneypiece from Utrecht is a particularly refined piece of work, and is now situated in the museum of that town. It came, however, from the Hause der Neuen Gracht at Utrecht. The prettily-designed frieze carries the arms of the Mom and Culemborgh families, dating from the middle of the 16th century. The bearings are partly coloured, and M. E. Mouris has drawn out a useful detail to a large scale, with the tints marked on. The panels below the general view here given are from another specimen in the same museum. At Nymegen there is an interesting Raadhuis, or Town Hall, elaborated with statues, and a great Gothic church of early date; but the book before us gives a series of interesting drawings devoted to the great market-house and the quaint gatehouse leading from the Grand Marché to the Platze der Stefanskirche. Both the market-house and the gateway are thoroughly Dutch. The aldermanic stalls in the Town Hall at Nymegen are very complete, and, with the screened inclosure dividing them off from the Hall form a sort of tribune, the date of the woodwork being the second half of the 16th century. Of this specimen of joiner's art several sheets are given in detail. Arnheim Venlo has a quaint Rathhaus, with some big towers to it, which seem to bear relationship to some of the London School Board schools, and an Irishman might say that the design of the Arnheim Town Hall was possibly inspired by them. This Rathhaus has some good chimneypieces in it, with coffered bricks to the backs and jambs. Maarten van Rossum had a mansion at Arnheim, and here an ancient drawing of the old manor is reproduced by H. Leeuw, which shows what a queer place it must have been. The details of tables and other furniture from Utrecht Museum are, however, much more useful, and are set out to a good large scale. One of the most complete series of illustrations given shows the Schloss Oydonck, near Ghent, the ancient property of Herren von Nevele. It was destroyed by the Gantois in 1491, and was rebuilt by Phillipe de Montmorency in 1500; but during the religious wars of the end of that century it was devastated. Towards the end of the 16th or commencement of the 17th century the building was restored, and in 1864 Baron T'Kint de Naeyer, the present proprietor, engaged M. Parent, a Parisian architect, to put the place in order. The castle has therefore been considerably altered, but still contains much of interest with its great circular towers and high roofs. At Furnes, the abbey church and Rathhaus are interesting, and contain much good Flemish woodwork,

The remains of St. Willebrod's church, which escaped the French Revolution, form, too, an interesting subject for architectural study. Here the image of the Blessed Virgin is said to work miracles, and a good trade is done every year in consequence by the Roman clergy. The stalls in the cathedral are very good. The Rathhaus at Kampen, and the old bridge and tower over the I'Yssel, are well shown, with a lot of first-class woodwork and carvings from the same town, drawn to a largescale. Added to these are some cups and municipal plate. The plates throughout are well printed and arranged.

## COLLEGE CHAPEL, GREENWICH.

THE portions of the chapel shown in the illustration are those designed by James Stuart after the fire in 1779, which destroyed the dome and interior of the chapel. The carving throughout is most rich and delicate. These drawings obtained the second prize in a Travelling Studentship last session at the Architectural Association.

## BRISTOL CATHEDRAL NEW TOWERS.

THE completion of the west front of Bristol Cathedral, from the designs of Mr. John L. Pearson, R.A., finishes the work of reconstruction of the nave which was carried out with so much skill by the late Mr. George Edmund Street, R.A. The whole of the scaffolding has lately been removed, and we are enabled to-day to illustrate the building from an admirable photograph by Mr. W. Harvey Barton, of Llan House, Bristol. Mr. Street built the towers up to the line of the belfry level, some 72ft. from the ground, in 1881. Mr. Pearson's work, dating from Easter, 1887, consists of the upper stage, which measures 35ft. high. Both towers are alike. They are pierced on each face by two lofty traceried windows, divided by piers 4ft. wide. The angle piers are panelled on their faces save at one angle, where an octagonal stair turret is carried up and crowned by a stone spire several feet above the parapet of the tower. The turret is 8ft. in diameter. Doubling stone was used for the work, and oak louvres are placed in the belfry windows. Messrs. Booth were the builders for the two thirds of the work of these towers executed under Mr. Street, and the remainder of their elevation has been done by the contractors, Messrs. Cornish and Gaymer. The total height from the church floor to the top of the parapet is 107ft., and to the top of the turret spire the height is 134ft. The old central tower is 127ft. high. The new nave has cost £58,000, and the towers have cost about £18,000. The following illustrations of the cathedral have appeared in the BUILDING NEWS during recent years:—Mr. Street's new nave, Oct. 20, 1876; view across nave (drawing by the late Mr. Street), Sept. 2, 1881; new north front and porch, do., Dec. 21, 1883; the sacristy (measured drawings by E. W. Paul), Nov. 12, 1886.

## COTTAGES FOR THE OXFORD COTTAGE IMPROVEMENT SOCIETY.

THESE cottages were erected a few years ago in Plantation-road, Oxford, to provide some good artisans' dwellings. The accommodation consists of a large front sitting-room, a back kitchen, and outbuildings, together with three good bedrooms. They are built with local red bricks and tile roofs, and form a simple and effective row of cottages. Mr. H. Wilkinson Moore, of Oxford, was the architect.

The dedication of St. Christopher's Mission Chapel, Fisher Hill, Low Walker, was performed on Friday by the Bishop of Newcastle. Plans were prepared by Messrs. Dunn and Thompson, of St. Nicholas-buildings, Newcastle. The building is of red brick, with stone dressings, the gables being relieved with wall timbers filled in with gravel and plaster cast. The roof has projecting eaves, with moulded barge boards at the gables. The main building is higher than the chancel, and is surmounted with a turret. The chapel is 62ft. by 28ft. inside, and accommodates 320 worshippers. The cost of building alone has been about £600.

The Hon. W. H. B. Portman opened, on Friday, the Victoria Jubilee Nursery Institute, which has been erected and endowed at Taunton at a cost of £10,000, towards which an anonymous donor gave £5,000. After the opening ceremony, a bust of the late Dr. Wilson Fox, the work of Miss Margaret Thomas, was unveiled in the Shire Hall.



## WAYSIDE NOTES.

WREN'S Gothic is a by-word, so one cannot express surprise at the quality of the architecture shown in the drawing of the north transept of Westminster Abbey, which you reproduced last week. Nevertheless, one is led to reflect that good old Sir Christopher was easily satisfied with a design in his later days. It is to be regretted that, in your very interesting comments on this drawing, you were unable to give any information as to the why and wherefore of the appended signatures, as one feels some curiosity on this point. Mr. Mich. Evans—whoever that worthy may have been—put his sign-manual affectionately close up to Sir Christopher's. It would almost seem as if it should have been, "We do approve of this design," rather than "I," as Wren has it. In the face of this drawing one is anxious to know what Mr. Pearson has done, and is doing, with this north transept of our only Abbey. I fear that when the hoarding and scaffolding are removed, the feature will look somewhat too brand new to be pleasant. The old brown stonework was so toned and softened that the composition, curious as it was, never seemed to jar upon our feelings, and when the restoration, reparation, or whatever treatment it is undergoing, is completed, I expect we shall be unable to recognise the building as the same dear old Abbey, so well beloved of the London architectural student.

I suppose it is safe to conclude that Westminster Abbey has been more sketched than any other building in the world. And how many a budding architect has essayed his first sketch under the shadow of its walls! I carefully treasure an aged scrap of drawing-paper whereon is a representation of one of the Early cloister windows—a sketch I made when my good master pressed me to try my 'prentice hand at sketching at the Abbey—a remarkable, nay, in many respects, a wonderful, drawing! It would be interesting to have a tabulated list of sketches made at Westminster. Your own contribution, as set forth last week, is voluminous. Yet so much is there in the manner of it that the old abbey, which has been drawn and measured in every nook and cranny—which has been delineated with pencil and pen, freehandedly and geometrically, in outline and shaded, in monotint or coloured, and has been measured to the fraction of a barleycorn wherever the student can poke his measuring-rod—is to be shortly sketched all over again. Mr. Herbert Railton, I understand, has been commissioned to draw the whole of the abbey for the *Portfolio*—a commission doubtless entailing many months or years of work. That the drawings will be beautiful we may well believe, and the commencement of the series in the journal named will be anticipated with pleasure.

In the new edition of the "Last Essays of Elia," lately published, there is a pretty little drawing of Mr. Railton's, illustrating "The Tombs in the Abbey"—Lamb's appeal to Robert Southey to assist in doing away with the charges for viewing the Abbey made in those days. In our time we need hardly complain, as did "Elia," that "in no part of our beloved Abbey now can a person find entrance (out of service time) under a sum of two shillings." Five other pretty little sketches illustrate the "Essays." They are "Old Blakesware House," in Hertfordshire; "An Old China-closet"; "In the Cloisters, Christ's Hospital"; "Maskery End, in Hertfordshire"; and "The Temple Church"—six charming vignettes in all.

I have been looking through the October number of the Institute's *Journal of Proceedings*, and find that Mr. Wyatt Papworth has been writing upon "The Tombs in the Abbey." Mr. Papworth gives us a few conundrums. Those interested in monumental designing may endeavour to find the solutions to them. It is stated in the paper in the *Proceedings* that there are several gorgeous tombs of the time of James I., whose authorship is unknown, or, at any rate, in a glorious state of uncertainty. Among these, the writer mentions the tomb of Henry, Lord Norris, died 1601, and that of Sir Francis Vere, 1609, of which it is said that, when the sculptor Roubiliac was contemplating

it, the abbey mason, Gayfere, approaching him, exclaimed, "Hush! hush!—he will speak presently!"—a compliment, I take it, to the sculptor of the tomb. Another monument whose designer is unknown to the Abbey authorities is said to be that of George Villiers, Duke of Buckingham, and his wife, erected 1634. Here is an opportunity for anyone to show superior knowledge of the lives of Jacobean tomb-designers by informing us of the authors of the above monuments.

Please to remember the Fifth of November! The Institute gets to work again on that date. There is absolutely no foundation for the rumour that the Council will, on this occasion, burn the effigies of any members or past members of the Metropolitan Board of Works.

It was a great disappointment to me not to be able to attend the Association opening meeting, and listen to the presidential address. Inasmuch, however, as it was impossible to be in Devonshire and Conduit-street at one and the same time, it could not be helped; and have therefore had to console myself with reading Mr. Appleton's exhortation, which I have perused *in extenso* in the *Institute Journal*. It is admirable, even if one can hardly see how the "talking shop" idea would work in practice. It is certain that some means of bringing the members more together in friendly discourse would be a boon and a blessing. But does not this seem to point to the desirability of rendering a certain number of the evenings more convivial, and to the institution of a regular monthly, unassuming conversation? Every alternate meeting might be for this "talking shop" to one's heart's content, or to the exchange of ideas on divers other subjects. In a microscopical society of which I was, some years back, a member, we had, I recollect, ordinary and business meetings; but at the latter all the papers were read or lectures delivered, whilst at the former we brought out our microscopes, &c., and walked around and chatted over the various exhibits. It seems to me that it is just such evenings we want at the Association. Mr. Appleton's idea should be seized upon and worked out on these lines. The members of the A.A. want to be talked to less, and want to converse more. How many, like myself, have felt a trifle bored by the prolonged discussions, when one would like to be looking at the drawings, and discussing them with others? But the paper is long and a bit dry, the discussion drags out in er-hums and er-ahs, and when the meeting breaks up and one is hoping to get a glimpse, at least, of the drawings, &c., arranged with so much care, behold! they are swept off in the twinkling of an eye! There is something radically wrong in the system of meetings at present in vogue. Mr. Appleton's idea, if not exactly workable as expressed, should lead to some modification of the evenings that will allow of such friendly discussion as I have suggested.

I note Mr. Bidlake's complaint as to the "Phantom Client." If any phantom-like individual of middle height, about forty years of age, and wearing a sandy moustache, and whose spelling of the Queen's English is bad, and writing worse—if any individual answer to this description calls this way, and goes into the business your correspondent describes, he (the phantom-like individual) may be prepared for a warm reception.

A competition advertisement has cropped up, inviting plans and estimates for a new church at Barmouth, North Wales. No premiums are offered, and the designs are required post haste on or before Nov. 30. Yet, in spite of the unpromising nature of the advertisement, I doubt not but that great will be the rush for particulars, and heavy will be the list of those entering for the race. A church, as we know, is a favourite subject among competitors—perhaps the favourite of the majority of youthful competitors who can produce a respectable ecclesiastical plan, where they utterly fail on a pub. or other common piece of designing. I would, however, advise such to restrain their enthusiasm in this Barmouth competition, unless the information contained in the particulars has a more rosy tint than that in the advertisement. The whole affair appears too

hurried to be well arranged, and the invitation is bald enough in all conscience.

The mishap at Millbrook Parish Church, in Bedfordshire—in which, I believe, there is some beautiful 15th-century work—was certainly curious. One is inclined to say that gross carelessness must surely have characterised the operations conducted at the foot of the pier supporting the nave arcade, when preparations were being made for the new heating apparatus. The men engaged on the job may be thankful that they escaped with a whole skin. Someone will have to pay for the want of thought and care that occasioned the accident, as I expect it will be an expensive affair to replace the pier on wholly new foundations, put up the nave arcade, re-turn a couple of arches, &c. Unfortunately, it appears the ancient font is broken into fragments, and doubtless beyond piecing together.

Once more we have our attention called to poor old St. Mary-le-Strand. Mr. Archibald Campbell writes to the *Times* of the 30th ult., and asks what is the plan of campaign of the churchwardens and others with respect to the building. He points out, very truly, that the church has been dismantled unmercifully, and despoiled of its vases. Why these tea-urns are not replaced, I, for one, cannot comprehend. They are suitable to their position, and should, therefore, be reinstated. But utter callousness and indifference seem to characterise those in authority. The hoarding is kept up, and doubtless brings in a nice sum to the advertisement contractor; but if nothing more is going to be done, one would think it would be quickly bundled out of the way, unless, indeed, as the *Times* correspondent hints, the object of those having the care of the building in their charge is to make it look as wretched as possible, so as to hasten its condemnation and destruction.

GOTH.

## CHIPS.

The value has been declared at £171,752 19s. 6d. of the personal estate of the late John Griffith, F.R.I.B.A., of 6, Hanover-terrace, Regent's-park, and formerly of Finsbury-place, architect, who died on the 21st Sept., aged 91 years.

The spire of Coleshill Church, Warwickshire, is being rebuilt from plans by Messrs. Bodley and Garner. Messrs. Stephens and Bastow, of Bristol and London, are the builders, and Mr. D. Knight is the clerk of works.

The will of Mr. James Easton, late of No. 44, Prince's-gardens, a member of the firm of Easton and Anderson, civil engineers, of Whitehall-place and Erith, who died on August 26th, has been proved, the value of the personal estate amounting to upwards of £91,000.

The new church of Caledfwich, near Llandilo, was consecrated last week. It is Early English in style, and has been built from designs by Mr. Stephen W. Williams, of Rhayader, Radnorshire. It contains as memorials a reredos and pulpit, both executed from the architect's designs in Devonshire marbles by Messrs. J. and E. Goad, of the Phoenix Works, Plymouth.

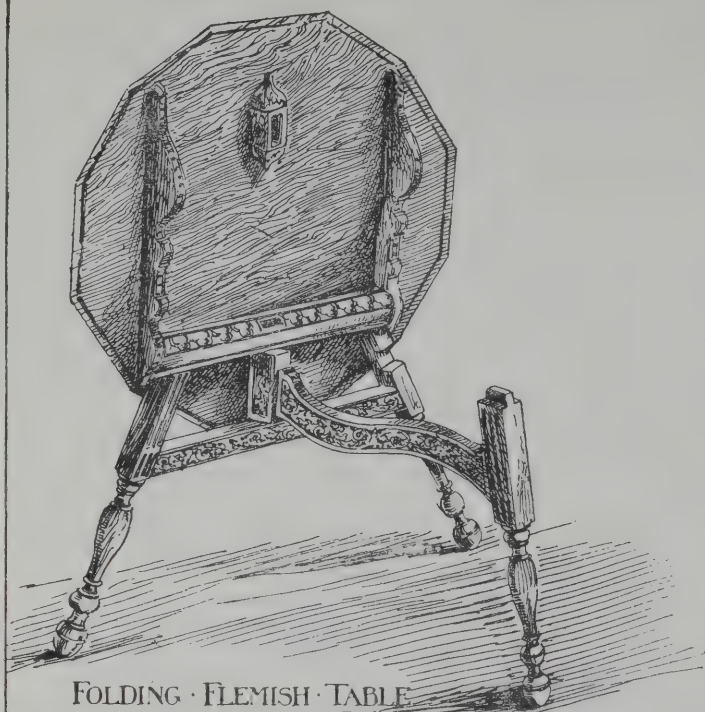
Mr. E. Wareham Harry, C.E., who has been for many years at Harrogate, has been appointed to the surveyorship of the borough of Cambridge at a salary of £400 per annum.

An addition has just been made to the Aberdeen waterworks, in the shape of two large reservoirs which have been constructed at Mannofield and Slopefield, and which will be formally opened on Saturday. By their accommodation the water storage of the town will be increased by thirteen million gallons. The Mannofield reservoir is 20ft. in depth and 370ft. in diameter, and is capable of containing twelve million gallons of water. The walls of the reservoir are built of granite, the bottom being filled in with concrete. The total cost has been £21,211. The Slopefield reservoir, which is 270ft. in diameter and 18ft. 6in. in depth, has storage capacity for six million gallons. The cost, including ground, has been £11,053.

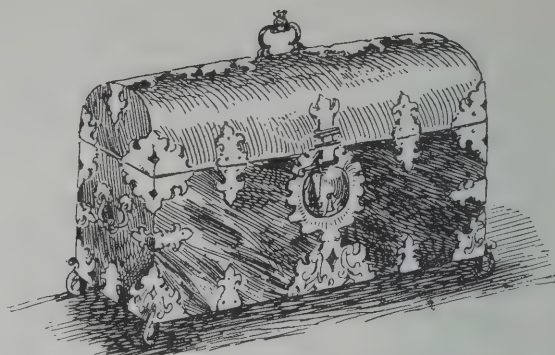
The death of Mr. John Kirk, of the Watton, Brecon, took place on Thursday week. Mr. Kirk held the office of county roads surveyor for many years, and was well known and highly respected throughout Breconshire. Mr. Kirk, who was 70 years of age, also held the office of county surveyor of main roads for Herefordshire for many years.

An extensive addition has been made to Mr. Wm. Hope's auction mart at Wighton by the erection of a block of cattle-pens. Mr. Geo. D. Oliver, of Carlisle, was the architect.

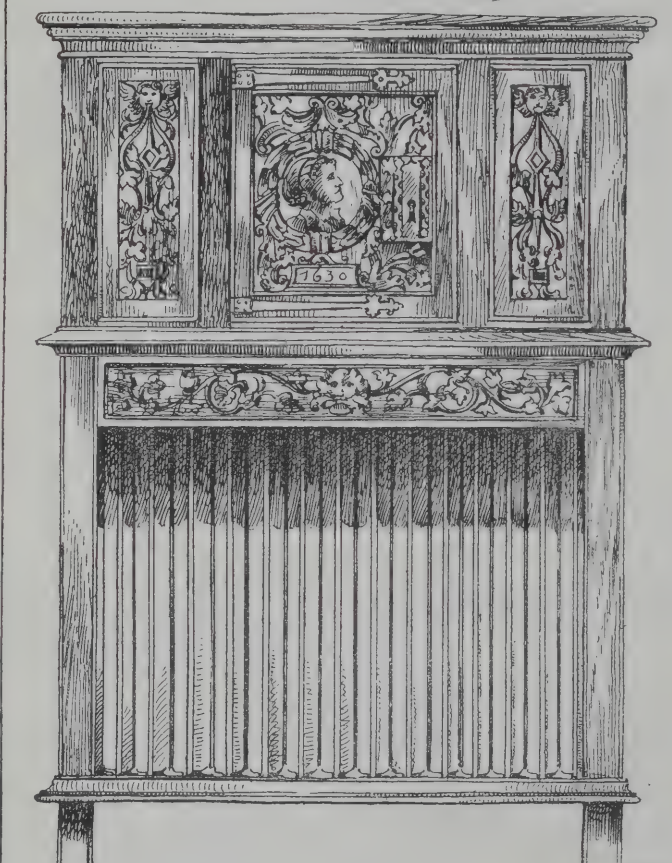




FOLDING · FLEMISH · TABLE



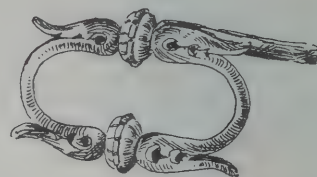
CHARLES II · GERMAN · CASKET



ITALIAN · OAK · CREDENCE



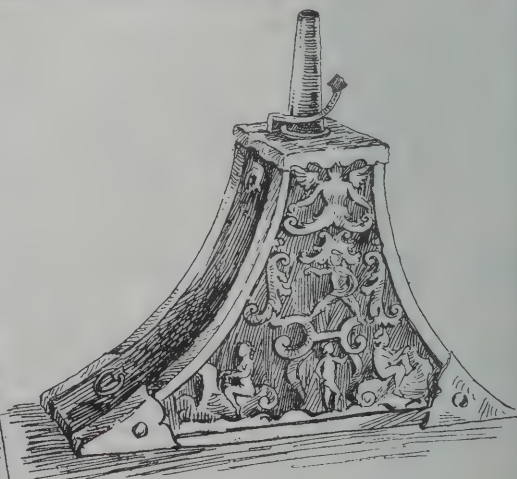
ANTIQUE · ITALIAN · BELLOWS



WROT · IRON · KNOCKERS



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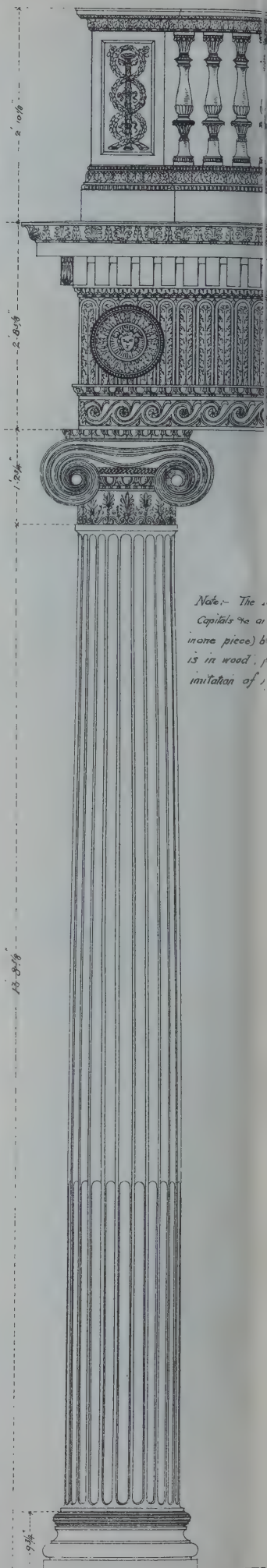
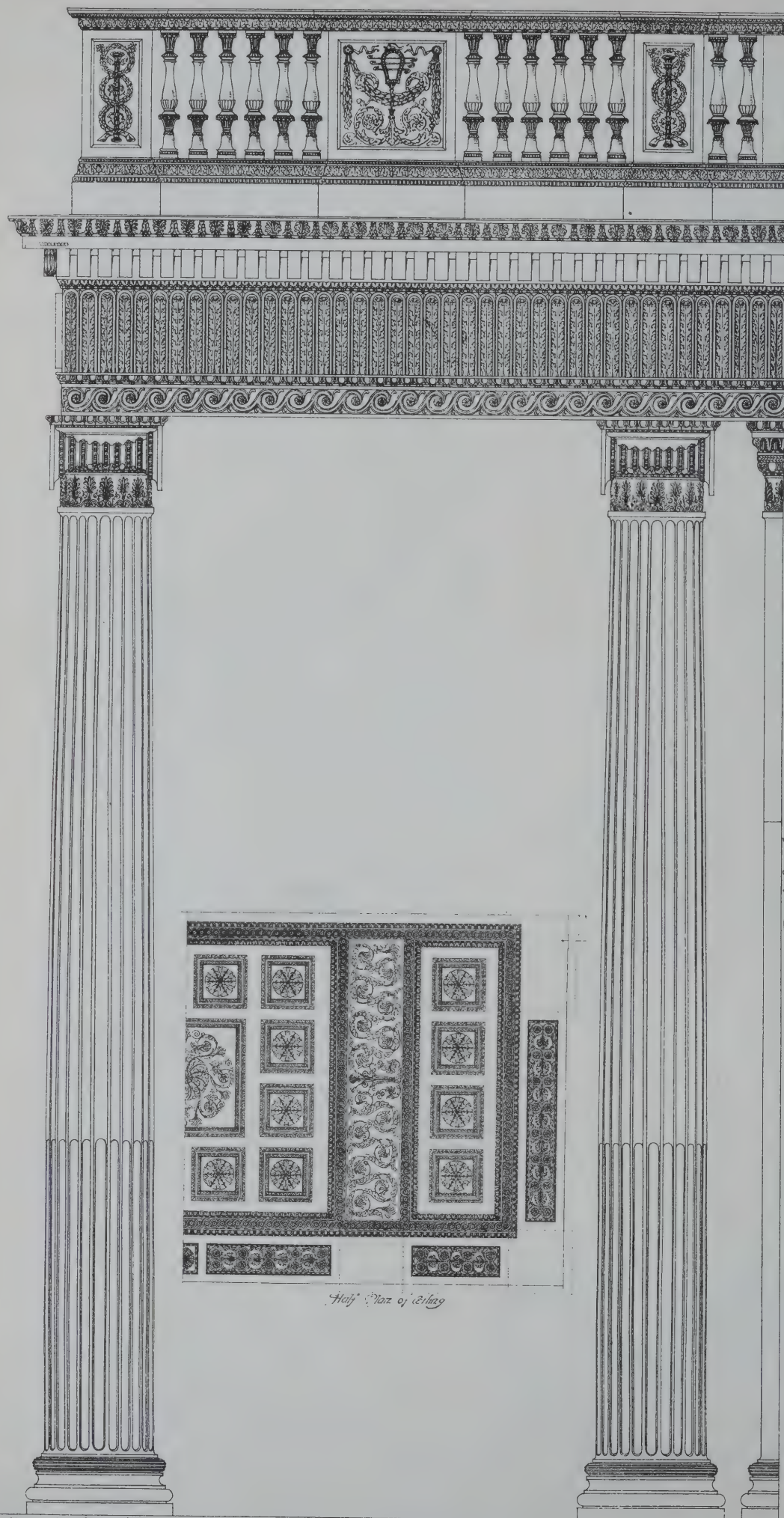
GERMAN · POWDER · HORN

SKETCHES · OF  
DECORATIVE · FURNITURE  
AND · OTHER · OBJECTS









Note: The  
Capitals &c. are  
in one piece but  
is in wood, &  
imitation of

Half Plan of Ceiling

Face of Wall

12' 0"

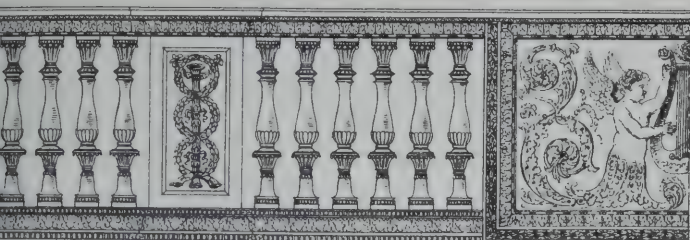
21' 0"

Measured & Drawn by  
H. D. Werry.  
April 1888.

Side Elevation.



Nov. 2. 1833.



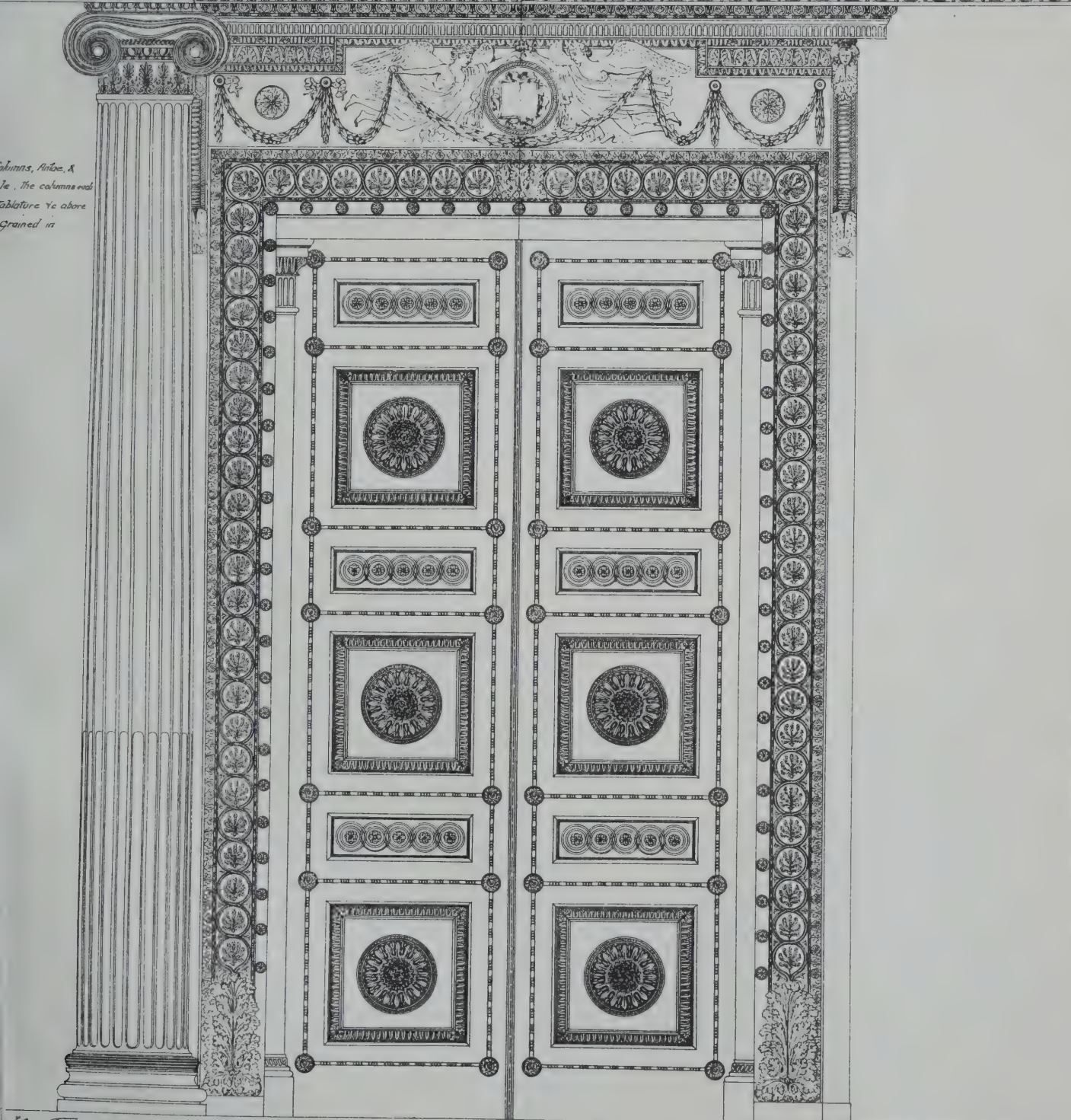
— ROYAL NAVAL COLLEGE CHAPEL —  
GREENWICH.

*Entrance under Organ Gallery.*

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Front Elevation.

Half Section at X.











THE BUILDING DEWS, NOV. 2. 1833.



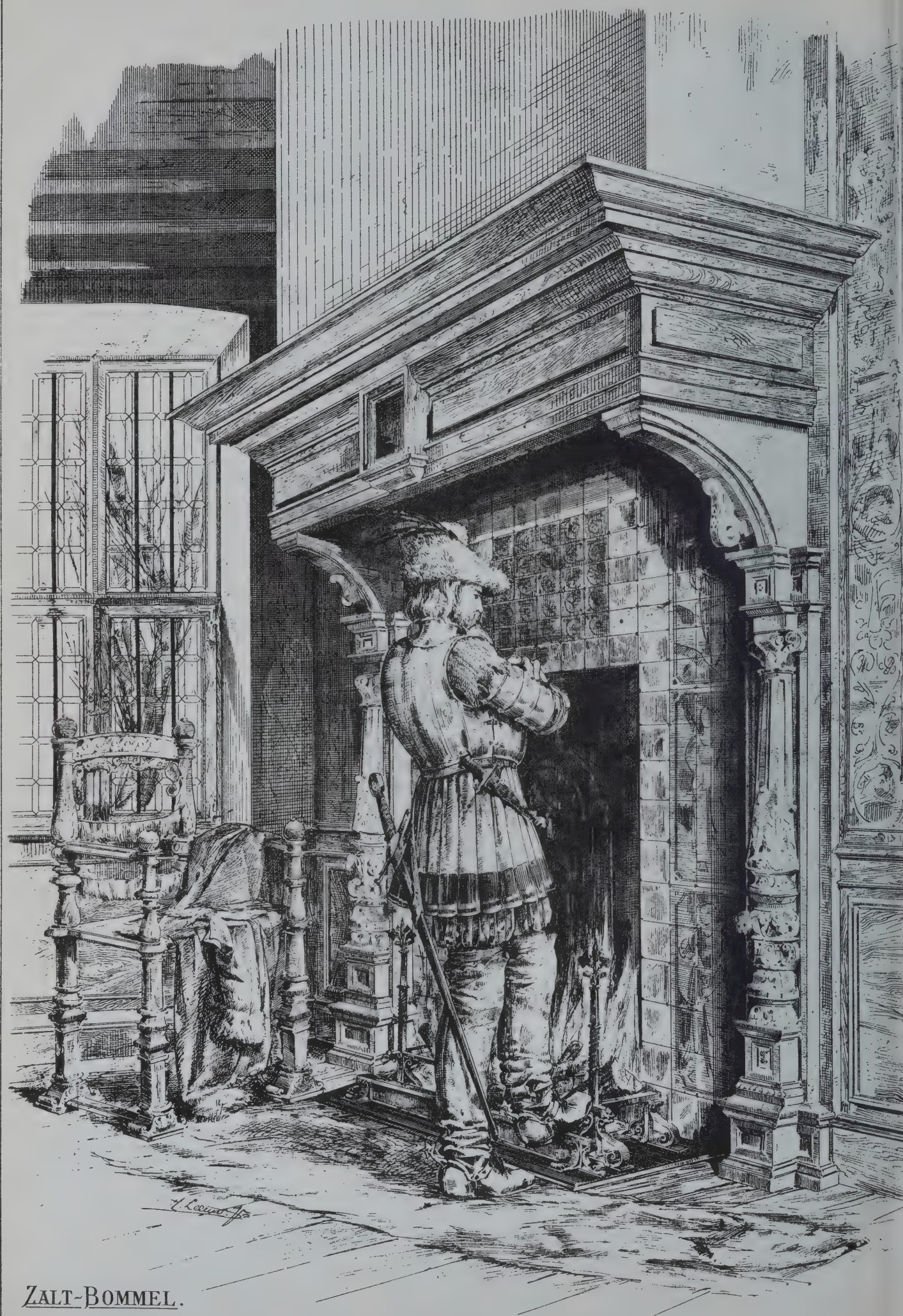
COTTAGES FOR THE OXFORD COTTAGE IMPROVEMENT SOCIETY

Photo-lithographed & Printed by James Acland, 6 Queen Square, W.C.



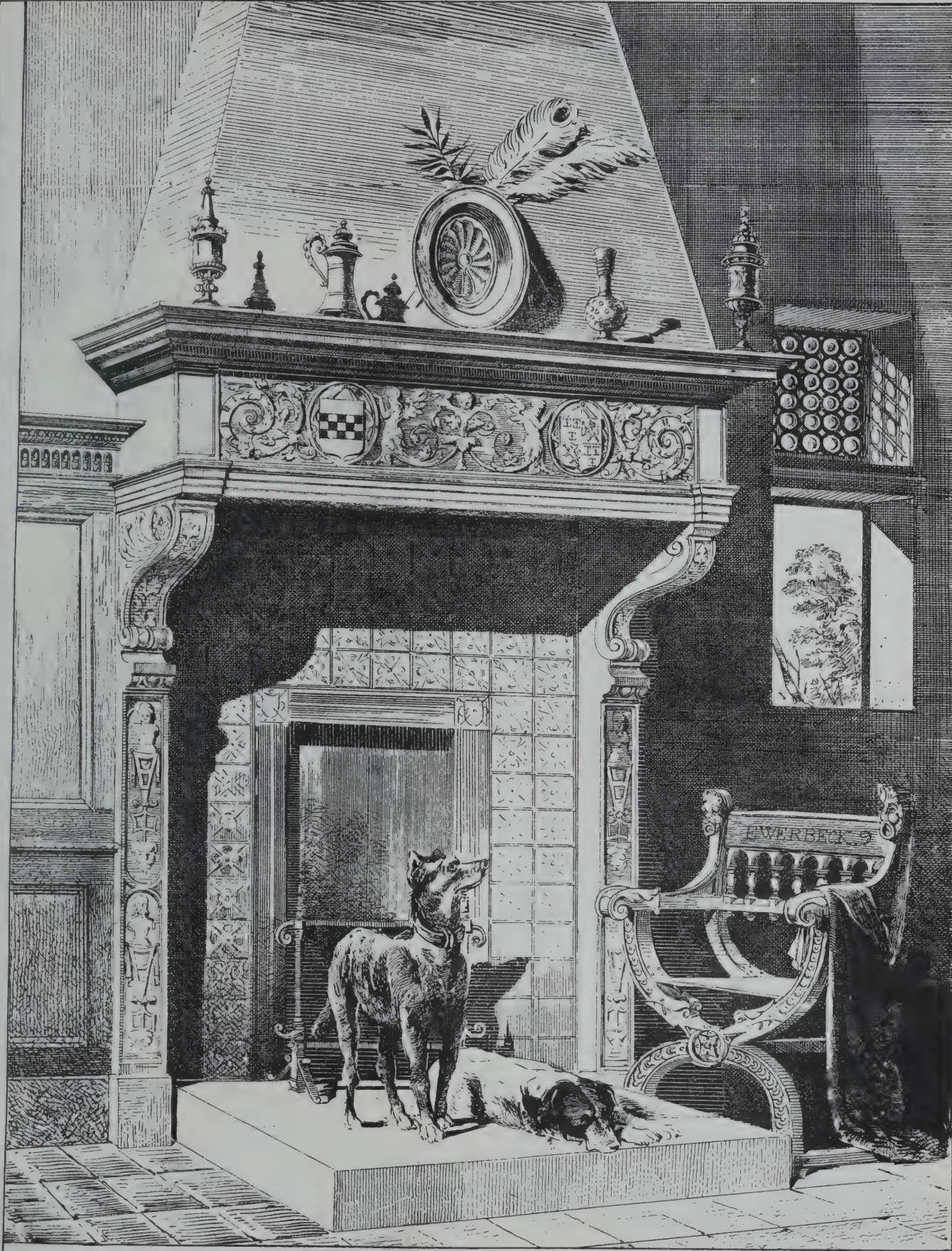




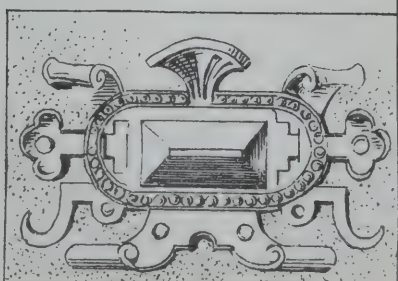
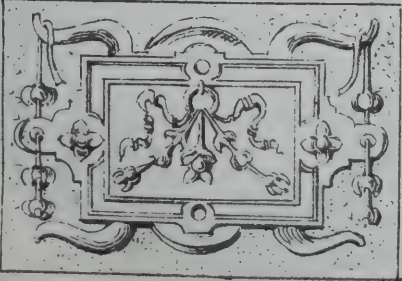


ZALT-BOMMEL.





UTRECHT.



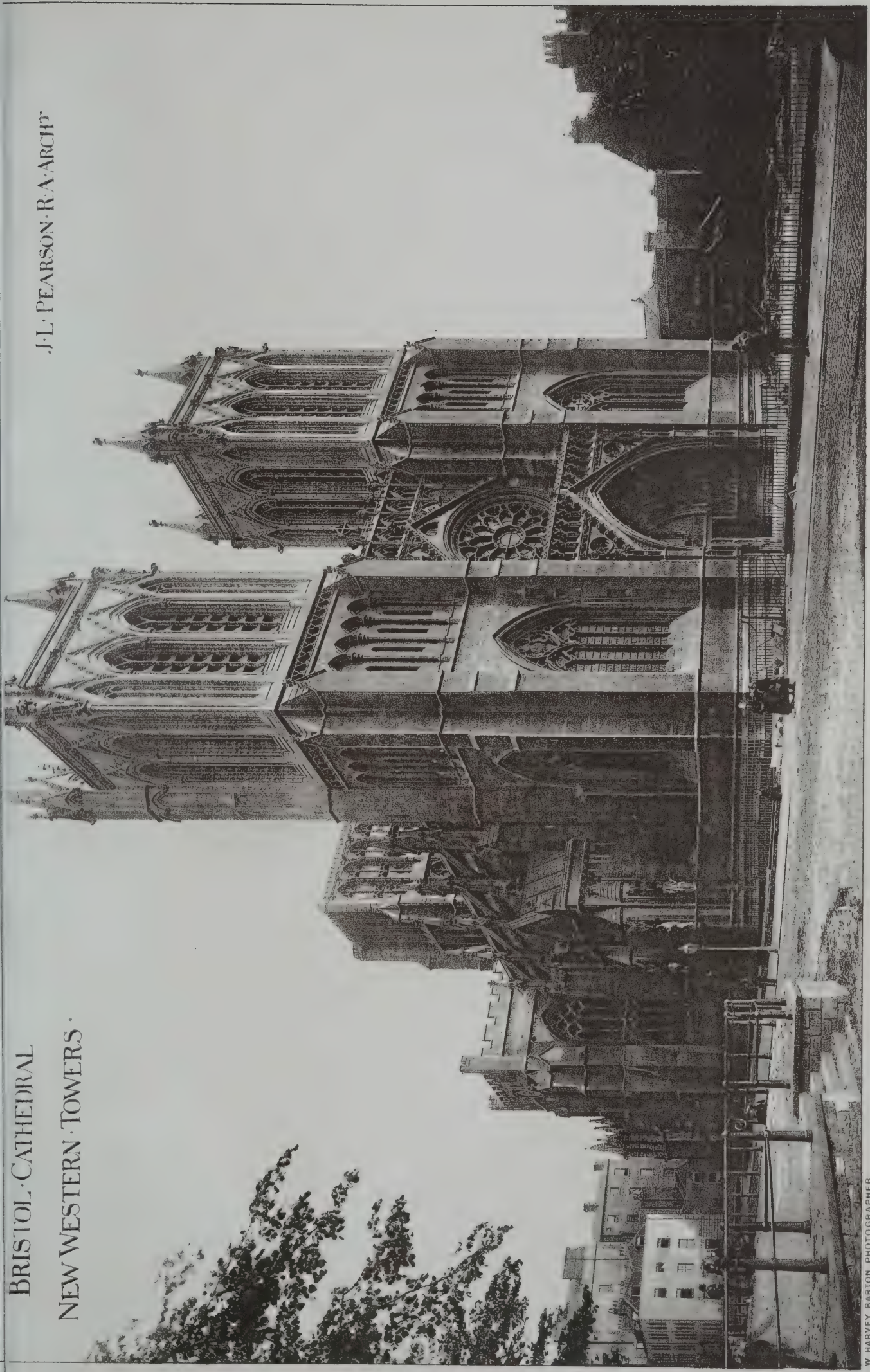






BRISTOL CATHEDRAL  
NEW WESTERN TOWERS

J. L. PEARSON · R.A. ARCHT<sup>r</sup>



W. HARVEY BARTON, PHOTOGRAPHER.

"PHOTO-TINT" by James Akerman 6, Queen Square, London, W.C.











THE BUILDING NEWS, NOV. 2. 1888.







Photo-Lithographed & Printed by James Alernan, 6, Queen Square, W.C.

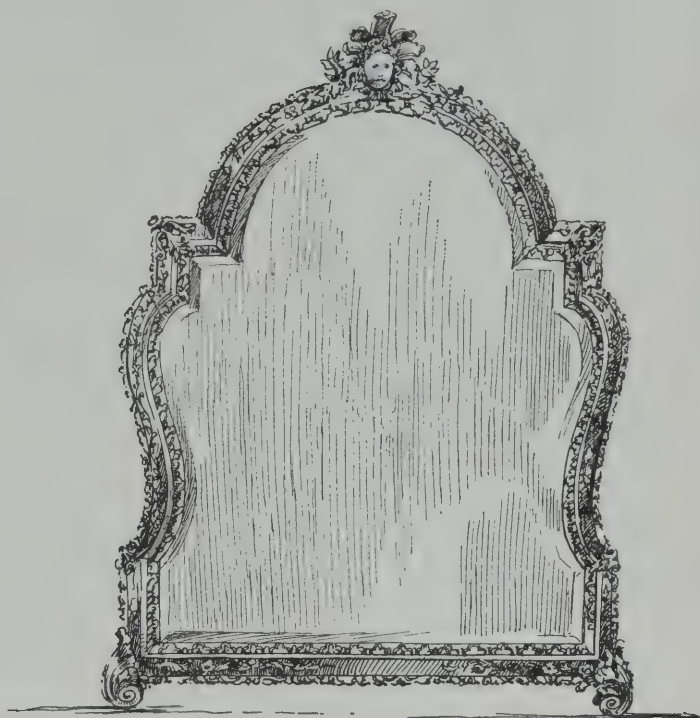








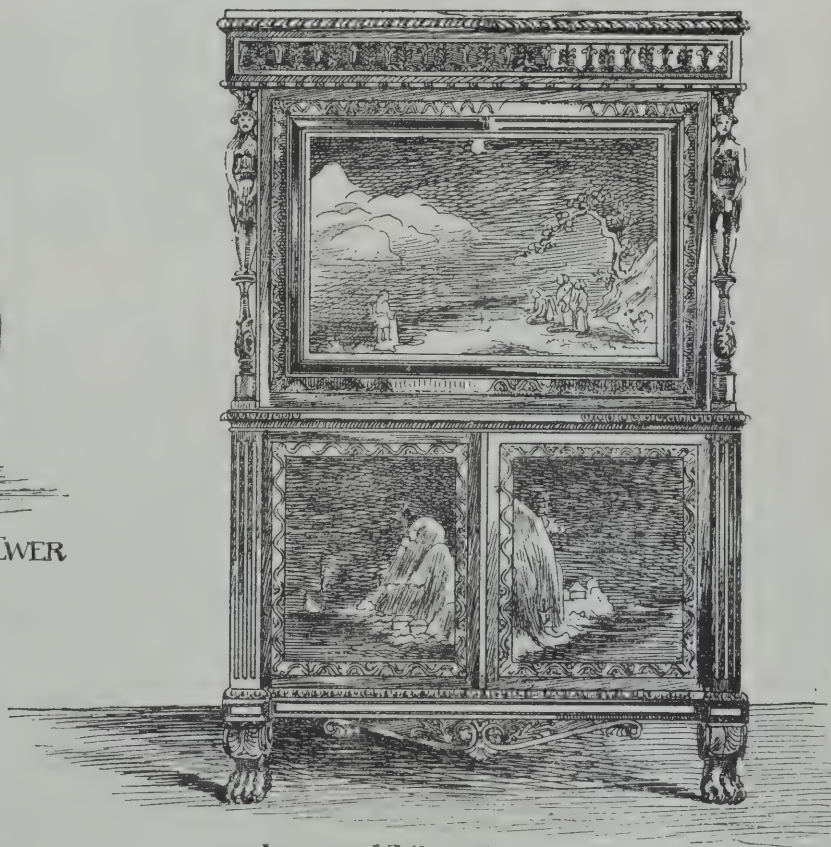
MAHOGANY · AND · EBONY · CABINET



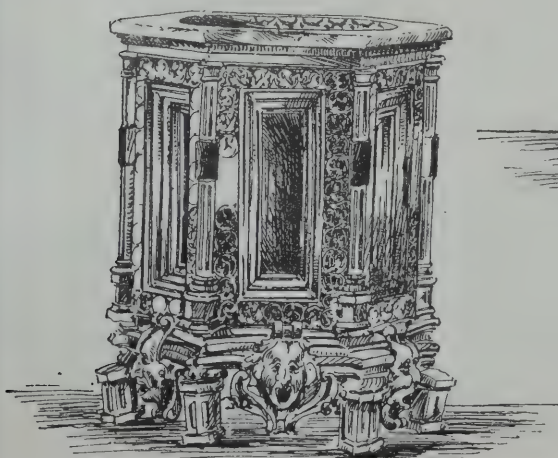
LOUIS · XIV · TOILET · GLASS



AN ANCIENT · ORIENTAL · EWER



LOUIS · XVI · SECRETAIRE



HENRI · DEUX · SALT · CELLAR

SKETCHES · OF · SOME  
DECORATIVE FURNITURE · AND  
OTHER OBJECTS



## SKETCHES OF DECORATIVE FURNITURE.

OUR illustration of Decorative Furniture to-day is of some very good objects which were originally in the celebrated Beckett Denison and Hamilton Palace collections. The Toilet-glass was of the Louis XIV. period, designed by Bérain, and made by Buhl; the border inlaid with flowers in brass and mother-of-pearl, and mounted with ornaments in chased ormolu. The Mahogany Cabinet had the front formed of a large panel of Japan lacquer, with a landscape and figures in gold on background, and was richly mounted-ormolu friezes and classic ornaments, and painted medallions by Augusto. The ancient Ewer was of very elegant form, made of Oriental glass, and was richly enamelled and gilt; on the lower part were seven equestrian scrolls. The Henri II. Salt-cellar was a good example of this rare and beautiful ware, and was inlaid with an intricate arabesque pattern. The base was surrounded by mouldings, and rested on six small pedestal feet. The Louis XVI. Secrétaire was of ebony inlaid with panels of Japan lacquer, with buildings and trees in gold on background; the friezes and mouldings of classic design, with Grecian honeysuckles, a slab of Egyptian granite surmounting all.

We give a few sketches of Decorative Furniture and other objects made at Mr. S. Willson's galleries in the Strand, where the disastrous fire occurred last week. The little Folding-table is a quaint and pretty piece of furniture. The little Charles II. Casket was of tortoiseshell mounted with chased silver straps and hinges. The Bellows were of Italian workmanship. The wrought-iron Knockers were good examples of German ironwork, roughly chased with a chisel. The Powder-horns were very fine specimens of what were used in the days of muzzle-loading guns, but were very clumsy. The Oak Credence was well carved, with the lower part filled in at the back with linen panelling, and the sides open. Nearly all these things, and many other beautiful examples of carved work—ivories, china, and paintings—were destroyed in the fire.

## THE SOCIETY OF ARCHITECTS.

THE President, Mr. W. Howard Seth-Smith, will deliver the opening address for the Session 1888-9 at a *conversazione* to be held at the New Gallery of Arts and Crafts, Regent-street, W., on Tuesday, November 13, 1888.

The ordinary business which would otherwise be taken upon that evening will be postponed till Tuesday, November 27, 1888, when a Special General Meeting will be held at St James's Hall.

The annual report states that 100 members and two associates have been elected during the past year, and seven members have been transferred at their own request into the class of associates, the total increase thus being 102. Five members have died—a large proportion for so young a Society—and 32 have left the Society from various causes, leaving a net increase of 65, the largest advance yet chronicled during the history of the Society.

Early in the year two special general meetings were held for making alterations in the rules, and at the annual general meeting further changes were agreed upon, necessitated by the growth of the Society in numbers and importance. Nine ordinary meetings of the Society were held, when an address was given by the president, Mr. J. J. Lish, and papers were read by Messrs. G. A. T. Middleton, John Leaning, H. Roumieu Gough, Edgar Farman, C. H. Searle, J. Starkie Gardner, and Walter Emden.

The work done by the council has included the consideration of applications for admission into the Society, which occupied a prominent place, particular care having been taken to exclude any improper person. The new rules will considerably lighten the labours of the council in this respect. Several members have at various times sought the advice of the council upon difficulties which they have experienced in the exercise of their profession, and after due deliberation such advice has always been willingly given, the solicitor to the Society having been consulted when necessary. The Society paid a visit to York and neighbourhood in September, at the invitation of the York Architectural Association.

The programme, which included a series of visits to places of interest in the neighbourhood, a *conversazione* given by the York Architectural Association, a banquet given by the Lord Mayor of York, and several meetings, was well appreciated. Visits have also been paid during the session to Mr. Gough's churches of St. Cuthbert's, Kensington, and St. Paul's, Hammersmith, under his guidance, and to the new Terry's and Court Theatres by the invitation of the architect, Mr. Walter Emden. The Council add: "The use of the Society's rooms has been granted to the Architects' Registration Act Committee for its meetings, and a petition was presented by Col. Duncan, R.A., C.B., M.P., from the members in support of the Bill. That this Bill should have been withdrawn all must regret; but the circumstances under which such action was taken by Col. Duncan was almost unprecedented. Some fifteen Bills were run through in a few minutes, and the Architects' Registration Bill was then called in an almost empty House, and in the absence of its numerous supporters. It is clear, therefore, that the measure did not receive fair discussion. The promoters will do well, however, not to underrate the opposition, especially that of the Institution of Civil Engineers, and to modify their Bill to disarm it as far as it is reasonable; but when it is considered that the medical profession were engaged for thirty years in obtaining their Act, and when their progress is compared with the interest evoked and the support obtained for this Bill, both in the profession, and in the Press, we believe the Registration Committee is justified in being sanguine that ere long the measure, at any rate in some modified form, will pass into law."

The balance sheet shows a total expenditure of £536 7s. 6d., the chief item being entrance fees and subscriptions, £499 15s; the balance in hand, which at the beginning of the year was £30 11s. 4d., is now £6 14s. 11d.

## "BUILDING NEWS" DESIGNING CLUB, 1888-9.

THE following are the rules of the club for the present session, giving exact particulars of all that is to be observed by members, it being clearly understood that the club is open to all readers of the BUILDING NEWS. The first list of subjects follows here, and others will be published on the first Friday of each month. Correspondents are requested to look for all notices intended for members of the club under the heading of Answers to Correspondents; and we cannot undertake to reply by letter to any questions respecting the competitions.

## RULES OF COMPETITION.

1. Drawings to be sent in twenty-eight days after the publication of the list of subjects.
2. Usually two subjects will be given every month, from which a competitor may choose.
3. The drawings to be executed in firm black lines on white drawing-paper, in sheets of the absolute size of 22in. by 14in., with no marks or tinting in colour whatever. Outline to be the first consideration; but drawings may be slightly shaded with shadows executed wholly in line suitable for photo-lithography, or they may be outlined in brown indelible ink, and worked with sepia, taking care to keep the effect bright, so that good reproductions may be obtained by the photo-tint process. Sectional parts in either case to be shown in ruled hatching or blacked in. The scale used to be drawn with each subject.
4. Drawings to be forwarded unmounted, by post, care being taken to roll the short way of the drawing, as packages over 18in. long are not transmissible through the Book Post.
5. On entering the class (which may be done at any time) each competitor is required to furnish his name and address, which must be written legibly on the back of each drawing, as a guarantee of good faith, the *nom de plume* the author intends to adopt being boldly marked on the front of each separate drawing.
6. Prizes of £10 10s., £5 5s., and £3 3s. will be awarded to the best series of designs, such series not to consist of less than eight subjects. Our decision to be final.
7. Before awarding the prizes, any contributor will be expected to furnish proof, if

necessary, as to his age, and the time during which he has been engaged in professional pursuits, though no candidate need be strictly an architectural student.

8. We reserve the right of arranging the drawings for publication in any manner we deem necessary.

9. A brief critical notice of the designs sent in of each series will be given, with illustrations of some of the chosen plans, in an early issue following the receipt of the drawings.

## FIRST LIST OF SUBJECTS.

A.—A Police-Station for a small Country town. To comprise on the ground floor a charge-room, 20ft. by 16ft., leading out of the entrance hall, which may be about 12ft. by 8ft. wide. The charge-room is to be made to communicate direct by a corridor leading to the cells, of which there are to be five, two for each sex, and one cell besides for placing more than one prisoner in should occasion require. There is to be also a search-room, 10ft. by 10ft., a bath-room, and a room for stolen property, 6ft. by 4ft. A clerk's-room, 12ft. by 10ft., is to be provided, and a constables' common room, 12ft. by 10ft., or thereabouts, suitable latrines, lamp-room, &c., required. Accommodation on the first floor is to be arranged for resident inspector, reached by a private door from the street; the residence is to have a sitting-room, kitchen, scullery, &c., and three bedrooms and w.c. upstairs. A house-yard and way down to it are to be contrived. The site, which is 100ft. deep, is situated in a main street, having a frontage of 48ft., with a public sideway on one flank return (4ft. 6in. wide), along which lights may be obtained, and a constables' entrance to the rear of the buildings. The materials used are to be stone walling and slate roofs. Style, Late English Gothic. Scale,  $\frac{1}{4}$ th of an inch to the foot. Drawings sufficient to illustrate the design, including small perspective sketch and block plan to reduced scale.

## CHIPS.

The National Gallery has been enriched by the gift from the Constable family of five pictures by the famous landscape painter. They are "The Cenotaph," "Flatford Mill on the River," dated 1817, "The Glebe Farm," "View of Hampstead Heath," and "Harwich—Sea and Lighthouse." Another recent addition is a portrait by Gainsborough, described as "Maurice Auguste Vestris," the gift of Mr. Swinton.

A fire occurred on the works of the Cattybrook Brick Co., Bristol, on Saturday morning, and destroyed the carpenters' and blacksmiths' shops.

The new Board schools which have been erected by the Birmingham School Board in Soho-road were opened on Monday week. The style adopted is Gothic, and accommodation is provided for 1,000 children. The whole block averages 788ft. long by 90ft. in width. Sixteen class-rooms are provided, each to accommodate sixty scholars. Eight of these rooms are arranged in pairs, divided by revolving screens. The class rooms are grouped round two large assembly halls, 67ft. by 30ft., and 55ft. by 30ft. The schools have been built of brick, with terracotta dressings. The total cost will be about £9,400.

After a long delay the Oswestry Town Council have finally adopted a scheme for an improved water supply for the borough, prepared by Mr. Roife, C.E. By this scheme it is intended to construct a reservoir on land purchased at Penegwely, the present source of supply to contain 24,000,000 gallons. Tenders were received some time ago for carrying out the work; but, as they all exceeded the engineer's estimate, amended plans and specifications were prepared and fresh tenders invited. From those the lowest, that of Messrs. Jevons and Sons, of Dudley, has been accepted at £9,340.

The chateau of the Duguesclin family at Montmuran, near Montfort, Brittany, was burnt down on Friday. The chapel, a 16th-century building, was saved.

The memorial-stone of a public park at Pudsey, near Leeds, was laid on Friday. The ground which is to be made into the park has been bought for £2,162 by the Pudsey Local Board, and is about six and a-half acres in extent. The main entrance to the park will be from Church-lane, where a gateway will be erected. At one side of the gates a lodge will be erected; a second entrance to the park will also be provided from Radcliffe-lane. A wall 2ft. 6in. in height, and surmounted by railings, will be built round the park. The work will be carried out from the designs of Mr. C. S. Nelson, architect, of Leeds and Fulneck. The lodge and the boundary-wall will cost £1,000.



## Building Intelligence.

**BURTON DASSETT.**—The parish church, well known to all visitors to Edge Hill, has been partly restored, under the direction of Mr. J. A. Cossins, Birmingham. Part of the church dates back to the 12th century, the portions remaining being the north and south doors, good samples of Norman work, still substantially sound. The main body of the church dates from the 13th century; but alterations were made at later periods, a clerestory being added to the nave in the 15th century, and a roof in the 17th. The works carried out include a reconstruction of the roof, all the old timbers available being retained, and where the trusses were found to be rotten, new ones have been supplied; but these are not close imitations of the old ones. The nave is to be relaid with the old 14th-century tiles, the remainder of the floor being paved with the local stone flagging in continuation of the old work; all the mould is to be excavated, and the whole laid with concrete. The ancient plastering retains indications of coloured distemper paintings of two periods overlying each other; these will not be disturbed.

**THE BRIGHTON ALHAMBRA.**—This building was opened on Monday, the 29th ult. It has been erected from the designs of Mr. Frank Matcham, 3, Great James-street, London, and will accommodate about 2,000 persons. The elevation towards King's-road and Russell-street is of red brick and stone. The stage is a large one, and contains all the latest improvements. The decoration of the theatre is in French Renaissance, and is carried out from the architect's designs, the prevailing tints being cream, rose, and gold. The ceiling is wood at the sides, springing from the top of the private boxes, and is divided out into ornamental panels by richly gilded ribs. Between the boxes are bold ornamental columns starting from the ground floor up to the ceiling, from which spring the main ribs of the ceiling. The boxes are circular-headed, and are filled in with carved heads and ornamental panels. The stage opening is fitted with an asbestos fireproof curtain. The building throughout is fitted up with hydrants. The electric light is used in all parts. The theatre has been erected by Mr. Arthur Dean, of Brighton. The fireproof curtain is made by Bell's Asbestos Co., and the drop-scene is from the brush of Mr. A. Calcott. Mr. R. Briggs has acted as clerk of works.

**COVENTRY.**—A meeting of the St. Michael's Restoration Committee was held on Friday to consider the subject of the re-hanging of the bells in St. Michael's tower. A letter from Mr. J. Oldrid Scott, architect for the restoration, was read, summing up the conclusions of Lord Grimthorpe, Canon Cattley, and other authorities as being in accordance with his own—that the tower was never intended for bell-ringing, and that it would not be safe to re-hang the bells if they were to be rung, but that they might be re-hung and chimed, though this would destroy the noble lantern. A long discussion took place, but the report was adopted and the question of getting referees, possibly to consist of both architects and engineers, was referred to the working committee, with instructions to report to a future meeting. The liabilities incurred in the restoration up to the present had been £37,400; subscriptions, legacies, &c., amounted to £33,072 18s. 7d., of which £632 had been lost, so that more funds would be needed.

**IYCHURCH.**—Considerable alterations and additions are to be carried out for the Earl of Radnor to Iychurch Manor House, Wilts, under the direction, and from the designs, of Messrs. Taylor and Gordon, 72, Finsbury-pavement, E.C. Iychurch was originally an Augustinian priory, founded early in the reign of King Stephen. Very little now remains of the ancient building, but there is on the S.E. side an Early Norman arcade (of which two bays are in fair preservation), forming, in all probability, the aisle of the church attached. There is also a buttress of Early English date, but the remains are not sufficient to form any accurate idea of the original plan. The existing building has no pretensions, from an architectural point of view, and it is the object of the architects, in carrying out these altera-

tions, to retain anything of interest that may be discovered.

**KENSINGTON.**—St. Paul's Church, Kensington, was opened yesterday. The length is 145ft.; breadth across transept, 67ft.; superficial area, with walls, including vestries, porches, baptistery, &c., 9,300 super. feet; height, from nave floor to ceiling, 50ft.; cubical contents, including vestries, porches, foundations, flèche and heating chamber, 41,600c.ft.; level of nave floor 2ft. 6in. below level of pavement in vicarage gate; cost, £10,000; accommodation, 975 persons; cost per sitting, £10 5s.; cost per cubic foot, 5½d. The plan is so arranged that the greater part of the congregation are placed at the eastern end of the nave and in the transepts, and that the proportion of those who are unable to see the pulpit should be only 8 per cent. instead of 17 per cent., as in churches planned in the usual manner with nave and aisles. The walls of the church are built almost entirely of red brick from Acton and Bracknell, stone being only used for the capitals, crosses, terminations to pinnacles, and the sedilia. The roofs are covered with red tiles from Ruabon, N. Wales, the variations in the tints being that naturally obtained in their burning. The ceilings are all of pitch pine, and the exposed timbers in the flèche are teak; the upper roof of the flèche is covered with copper. The sculptured panel on the gable, of St. Paul Preaching at Athens, and also the architectural carving, are by Mr. Bridgeman, of Lichfield. The altar table is by Messrs. Farmer and Brindley, of 67, Westminster Bridge-road; the tile pavement by Messrs. Simpson and Mawe, of St. Martin's-lane. The architect is Mr. Arthur Baker, F.R.I.B.A.; clerk of works, Mr. H. H. Hughes.

**SHREWSBURY.**—A new pulpit has been erected in the Abbey Church. The beautiful structure standing in the open air on the south side of the church suggested the design for the new pulpit, although the latter is of much smaller dimensions. It consists of a moulded base, with short shaft and moulded and carved capital. A deep, richly-moulded corbel springs immediately from the cap, upon which the body of the pulpit rests; this is octagonal in form, having a moulded sill and panels, finished by a moulded cornice. The stone is from the Forest of Dean, and the panels are of Caen stone, six in number, on which are sculptured reproductions of the figures of the old extant pulpit. These stand on brackets, and are covered with cusped and crocketed canopies. Messrs. Bowdler were the contractors for the general work, Mr. Landucci being engaged on the carving and sculpture, under the direction and instructions of Mr. J. Nurse, of Dogpole, Shrewsbury.

**WEST DULWICH.**—The foundation-stone of All Saints Church, West Dulwich, was laid on Oct. 31. The plan shows a wide and lofty nave of proportional length. There are seven double arched bays, the shafts and main arches being carried up in red brick, relieved with stone caps, bases, and bands, the remaining portion of walling being of yellow brick, relieved here and there with red brick and stone bands. The three easternmost arches open into wide north and south aisles, which are gable-roofed. An apsidal baptistery, with north and south narthex at sides, are thrown out at the west end, immediately under a row of five single windows and a large rose window in western gables. Two towers, placed anglewise, and pierced with arches on all four sides, flank the great chancel arch north and south. The chancel, which is the same height as the nave, is pentagonal in form at east end. A kind of rood-screen is formed of wrought iron about 30ft. from nave floor. At the east end of north aisle is formed a complete chancel and sanctuary, which, together with north aisle, accommodating as it will about 200 people, forms almost a complete small church, with separate entrances for clergy and laity. The church, when finished, will accommodate about 1,400 adults. The work is designed by, and is to be carried out under the superintendence of, Mr. Geo. H. Fellowes Prynne, A.R.I.B.A., of London. The contractors for the work in hand are Messrs. Kynock and Co.

The annual dinner of the Builders' Benevolent Institute will be held at Carpenters' Hall, E.C., on Thursday, the 29th inst.

### COMPETITIONS.

**BRADFORD CHILDREN'S HOSPITAL.**—The limited competition between five firms of local architects for new buildings for this institution has resulted in the selection by the committee of the design sent in by Messrs. H. K. W. and J. E. Marten, of Manningham-lane. The selected design for the new building is in the Queen Anne style. The central portion of the frontage will be, as usual, devoted to the administrative department, and circular wings forming the hospital proper. The latter will consist of two large wards, capable of holding fifty beds; but in the first instance only one wing will be built. At the rear of the central portion there will be an isolation ward. The walls of the wards will be substantial, the masonry being 2ft. thick, with ashlar dressings, and they will be lined with glazed bricks, with dado and plinth. On the roof of each ward block there will be a sun-room and an open space.

### ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

**LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.**—The following is the syllabus for the ensuing session: Nov. 12, address by the President (Mr. Henry Perkin); distribution of prizes. Nov. 26, "Furniture and Woodwork of 17th Century," by Mr. Arthur Marshall, F.R.I.B.A. Dec. 10, "Beauty in Colour and Form; How to Seek, where to Find," by Mr. J. Aldam Heaton. Jan. 7, 1889, "Art Metal Work," by Mr. J. Starkie Gardiner. Jan. 21, "Architects of the English Renaissance," by Mr. Reginald T. Blomfield, M.A. Feb. 4, "A Plea for Old English Art," by Mr. Robt. J. Johnson, F.R.I.B.A. Feb. 18, "Interior Decoration and Furniture," by Miss A. Garrett, of London. March 4, "Colour in Architecture and Interior Decorations," by Mr. Wm. Scott Morton. March 18, "Canterbury Cathedral," by Mr. C. Hadfield, F.R.I.B.A. April 29, Secretary's report; election of officers. The Society's Silver Medal, and an additional prize of five guineas, offered by the president, will be given for measured drawings of the Chapter House of Howden Church. Plans, elevations, and sections will be required, drawn to a scale of 3-16ths of an inch to a foot, and ¾ in. scale details, with full size mouldings, on separate sheets from the general drawings. All drawings are to be made on white imperial size paper, in Indian ink, with the sectional portions tinted black.

**MANCHESTER ARCHITECTURAL ASSOCIATION.**—The fourteenth annual report of this Association to be submitted at the inaugural meeting on Tuesday next, states that there has been during the session a net increase of ten, the numbers now standing—honorary members, 9; ordinary members, 64. Regret is expressed that the classes have been so poorly attended; the prizes for the students' drawings were awarded by Mr. J. Ely to A. S. Chadwick 1st, and A. H. Mills 2nd. The balance sheet is very satisfactory, showing a total expenditure of £60, and a balance in hand of about £10. The programme for the ensuing session is as follows:—Nov. 6, President's address; Nov. 20, "House Heating Water Fittings," by J. Corbett. Dec. 4, Reserve; Dec. 18, "House Cold Water Supply Fittings," by J. Corbett. 1889, Jan. 8, Reserve; Jan. 22, paper by J. A. Gotch, of London and Kettering. Feb. 5, "The Treatment and Manipulation of Metal in Art Metal Work," by A. Standing; Feb. 19, paper by H. B. Bare, of Liverpool. March 5, "Commission," by L. Booth, Nomination of Officers; March 19, Election of Officers.

On Saturday the Earl of Meath opened a new gymnasium connected with the Gordon Working Lads' Institute, Stanley-road, Liverpool, and erected at the sole expense of Mr. William Cliff, at a cost of £1,000. It stands at the back of the main building, is 100ft. by 65ft., and is said to be the first building on so large a scale built in Liverpool expressly for a gymnasium. The architects were Messrs. Horne, Macmurdie, and Rathbone, of Liverpool.

The attachment of a new lightning conductor, and the repairing of the vane on the spire of St. Mary Redcliff Church, Bristol, are being carried out by Mr. J. Armitage, "steep-jack," from the firm of Messrs. J. W. Gray and Son, of London.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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## ADVERTISEMENT CHARGES.

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## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

## NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII, XLVI, XLIX, L, LI, LII, LIII, and LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—C. W. B.—F. I. Co.—S. and W.—A. S. Co.—W. E. R. and Co.—G. B. and L.—E. B.—F. L. and Co.—W. J. R. H. and Co.

T. R. M. (The burners do increase the light, but they are not durable. We have tried them in our own office, but have done away with them.)

## Correspondence.

## STRAINS.

To the Editor of the BUILDING NEWS.

SIR,—In the opening paragraph of the last article that appeared under the above heading in your issue for the 19th inst., readers are told that the loads which beams are capable of "sustaining without failure" are known as their "B.W., or breaking weights." Some sixty-seven lines later in the article readers are told, and with more truth, that a breaking weight is the load under which a structure will succumb.

As these two theories are in conflict, I may be pardoned for pointing out that the first paragraph on "Strains" in your issue of the 19th inst. would have been more in accordance with everyday practice if the portion in brackets had been omitted.—I am, &c.,

SYDNEY B. BEALE.

16, St. John's Villas, Upper Holloway,  
October 30th.

The Lichfield City Council having applied to the Local Government Board for sanction to borrow £2,000 for purposes of street improvements, Mr. J. T. Harrison, C.E., held an inquiry into the application on Friday. The city surveyor explained that the foot pavements of the city and suburbs were in an unsatisfactory state, and it was proposed to pave these in all the principal thoroughfares and roads at one time.

Mr. John Sterland Gratton, principal land agent and surveyor to the Midland Railway Company, died on Wednesday week at his residence at Stretton, near Clay Cross.

## Intercommunication.

## QUESTIONS.

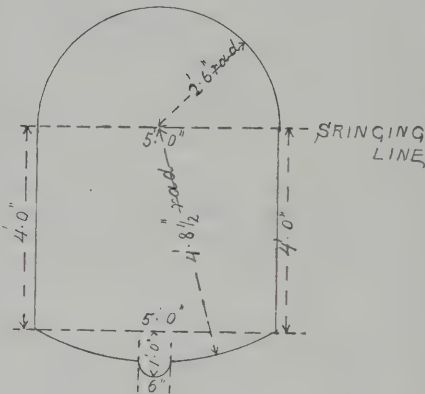
[9802.]—**Licenses.**—1. Is it necessary to take out an estate agent's license if one wishes to survey land, lay out same, and sell it in plots for a client? 2. Or to have a house agent's license to sell houses for a client?—C. GEONE.

[9803.]—**Stone Staircases.**—Is there any good work on construction of stone staircases showing how supported above first flight?—DOCKYARD.

[9804.]—**Draughts in Church.**—The worshippers in a church about 70ft. by 35ft. are much annoyed by mysterious draughts, especially at night, when the gas is burning. The place is lofty, and from motives of economy has no outlet ventilation, while all inlets are closed. A perforated board running along the ceiling leads into the roof. I imagine the draughts are caused by the heated air rising and inducing currents somewhat as wind is caused on the earth's surface. Can anyone suggest a cause and remedy?—CLERIC.

[9805.]—**Church Corner or Foundation Stones.**—Will some architect or master builder be so good as to inform me as to the existing custom with regard to church corner stones? Are they placed at the N.E. of the chancel, and is there any tradition of the reason of that or any other position? Are they ever in any churches found S.W.? Of course I only refer to pre-Reformation building. Are they placed below the level of the soil around, and is there any suggestion as to means for detecting them?—ALFRED E. P. RAYMUND DOWLING, B.A., Oxon.

[9806.]—**Water in Tank.**—Would some reader of the BUILDING NEWS kindly let me know the most easy method of calculating the amount of water at every



inch in height in a tank, as persketch, with a gradient of 1 in 400?—G. S. B. A.

[9807.]—**Hard Water Deposits.**—Can any practical reader inform me what is the best means of preventing the deposit from hard water choking up the lead pipes of an ordinary house water service?—Q.

[9808.]—**Copper Chains for Domes.**—Where can such chains be best obtained, and of what form should the links be made for use in a stone-built dome 14ft. in internal diameter? Any reliable particulars would be of service, and oblige.—AMOS.

[9809.]—**Gas Pipes.**—The gas supply in a church has been seriously impaired by the corrosion of deposit in the horizontal lengths of pipes which cannot be well got at. How can they be cleaned? If blowing be used, how is it applied?—CHURCHWARDEN.

[9810.]—**Rushton Hall.**—Are any drawings published of this old Northamptonshire house?—QUERY.

[9811.]—**"Stucco" or "Compo."**—What is the real practical difference between these two terms, once much more common than they are now in architects' terminology?—CRITICAL.

[9812.]—**Metropolitan Building Acts.**—Can any reader tell me of a handbook to thread the intricacies of these mazes and circumvent the district surveyors' wiles? I know there are many guides; but is there one that puts the matter into a compact form?—QUANDARY.

[9813.]—**Balcony.**—I have to cover the floor of a wood balcony, size 3ft 6in. by 27ft., and wish to avoid lead rolls, as it will be much walked upon. I should be obliged to any reader who can suggest any method of obviating the difficulty or recommend a more suitable material than lead.—ROMEO.

[9814.]—**Lighting Church by Gas.**—Suggestions will be welcome respecting the most suitable manner of lighting a church by gas at a moderate outlay. The church consists of large chancel and open-roofed nave of seven bays, with side aisle to nave. Would standards in the nave arches, to choir seats in chancel, and at Communion steps, answer best, or piping run on top side of label moulds to nave arches, behind chancel screen, and reredos? An answer or other suggestions will be acceptable.—TELEMACHUS.

## REPLIES.

[9783.]—**Gauging Streams.**—I think "Water-Wheel" will find the quantity of water passing over his 18 in. notch is 47.52c.ft., and over 6in. notch is 15.84c.ft.—STREAM.

[9794.]—**Inclosure for Hot-Water Heating Coil.**—For a handsome drawing-room I always use polished brass trellis work, lacquered, made by Strode and Co., Osnaburgh-street, London. It is light in appear-

ance, and allows a free exit for the warm air—a very important point. The brass strips may be 3/4 in. wide by 1 1/4 in. thick, and a plain brass margin all round, 1 in. or 1 1/4 in. wide, according to fancy. Trellis openings look best on the angle, and at each crossing may be a small plain stud which gives firmness and appearance. The frame to hold this brass trellis work may be made in wood, well seasoned, and can be decorated to suit with the surroundings. The wood frame should be rebated to receive the brass panel flush, and brass fly-nuts can be used to secure same to the wood. There may be a wood-plinth at the bottom with a few 1 in. holes in, ornamented, to allow cold air to circulate around the heated pipes. The top covering may be of marble, white or coloured, resting on balls 1 in. diameter in brass.—JOHN PINDER Engineer.

[9799.]—**Engineers' Charges.**—Land Surveyors' charges are given in Hurst's Handbook.—H.

[9801.]—**Light.**—"Vernon" must be more definite. Has A. enjoyed the light for 20 years, or how much less? If A. can prove his right to light, then clearly B. has deprived him of it, and is liable to an action; but A. must be quite sure of the date of the erection of the conservatory.—H. L.

[9801.]—**Light.**—As A. has not enjoyed his south light for the prescriptive period of 20 years, he cannot legally restrain B. from building at the end of conservatory. A. has been enjoying light coming over B.'s ground; B. might have built a wall at the end of conservatory to prevent the accrual of the right.—G. H. G.

[9801.]—**Light.**—Taking the facts as stated by "Vernon," it is doubtful if A. has a remedy at law, unless there be any windows which obtain their light through the conservatory, and the flow of light to which is interrupted by B.'s new building. Of course, the conservatory in this case is not used for the purposes of trade, and therefore no claim could be maintained on that ground.—R. WATSON.

## CHIPS.

The corner and memorial stones of a new chapel in Nottingham were laid on Monday week. The chapel, which is to seat 700, and to cost about £2,200, is to be erected in memory of the late Mr. Samuel Morley.

Mr. Owen Morris Roberts, architect, Portsmouth, who for several years has been a member of the Zynsynhaiarn local board and is chairman of the Portsmouth School Board, is a candidate for a seat on the County Council for Carnarvonshire to represent the Western Ward.

The Art Workers' Guild have become the tenants of the 15th-century hall of Barnard's Inn, Holborn, with its court-room and offices. The hall has an open-timbered roof, and the lower walls are panelled with the linen pattern. The premises have been put in repair by the Art Workers' Guild, and can be inspected on application to the honorary secretary, Mr. Reginald T. Blomfield, 39, Woburn-square, Bloomsbury, W.C.

The foundation-stone of a new Baptist chapel was laid at Buckley, Cheshire, on Tuesday week. The chapel, which will be Gothic in style, is to be 56ft. by 31ft., and will seat 200, with a schoolroom and two vestries attached. It is to be built of red brick, the front of Ruabon buff bricks, the windows to be of cathedral glass, and the roof of Carnarvon slates. The baptistery will be lined with white glazed tiles. The plans and specifications have been drawn out by Mr. J. G. Owen, Liverpool, and the work has been entrusted to Messrs. Roberts and Hughes, Birkenhead.

Two petitions similar in purport are at present before the Royal Scottish Academy, asking that the Academy should take steps to increase the number of Associates, and to give the Associates a vote—the same as is done in the Royal Academy—in the election of their own order. The one petition is from the present body of Associates and from Edinburgh artists not connected with the Academy, and the other is from the artists in Glasgow and the West of Scotland.

The town council of Barnsley have approved of sketch plans, prepared by Messrs. Morley and Woodhouse, architects to Mrs. Lambert, of a Kendray Fever Hospital, about to be built by that lady at a cost of £5,000, and intended to be presented as a free gift to the town.

A new pulpit is about to be erected in the church of St. Michael, Bournemouth. The design is Early English. The body of the pulpit is octagon on plan, entered by a short flight of six steps from the north transept. It stands on a circular central base shaft and a base arcading. On five faces of the octagon are panels designed by Mr. W. I. Warren, artist, of Bournemouth. A carved cornice runs round the top of the pulpit, and a book desk forms a canopy over the central figure. Mr. Reginald G. Pinder, F.R.I.B.A., of Bournemouth, is the architect.

A new drill-hall, erected at Seaham Harbour for the 2nd Durham Artillery Volunteers, was opened by the Marchioness of Londonderry on Saturday. The building is of a castellated character, has 70ft. frontage, and is two stories high. The chief hall is 150ft. by 65ft., and is floored with solid wood blocks, having stone bottom jointed with mastic, and laid on 6in. bed of Portland cement concrete.



## LEGAL INTELLIGENCE.

**WIDTHS OF STREETS AND PROJECTIONS UNDER THE METROPOLITAN BUILDING ACTS.**—At the Clerkenwell Police-court, on the 23rd ult., and again by adjournment on Tuesday last, James Hunt, builder, of St. John-street, Clerkenwell, was summoned by Mr. Ernest Carritt, A.R.I.B.A., district surveyor, for having infringed sec. 26, par. 2, of the Metropolitan Building Act of 1855 in the erection of a house and shop at the corner of York-street and King's Cross-road. The alleged offence was that the shopfront in question was being constructed of a greater projection than 5in. beyond the external wall, contrary to par. 2, which enacts that, in streets or alleys of a less width than 30ft., any shopfront may project beyond the external wall not more than 5in.; while in any street or alley above 30ft. in width, any shopfront may project 10in. The facts were not disputed, the plans put in by Mr. William Youtlen, M.S.A., 37, Great James-street, Bedford-row, showing that the bay-window of shop was advanced 8in. beyond the line of frontage. The point at issue was whether the street was over or under 30ft. in width. Mr. Carritt, the district surveyor, contended that the forecourt which was to be thrown into the public way when the shop was completed, ought not to count, when the width would be but 27ft. 9in.; but Mr. Youtlen protested that, as 5ft. 11in. had been added to the pavement by the removal of the forecourt, and was, indeed, now used for foot traffic, he had a right to regard the street as over 30ft., and to advance his projections 10in., if he chose. The magistrate (Mr. Bros) adjourned the case for a week for further consideration, and at the rehearing, on Tuesday, Mr. Carritt said he relied, for his interpretation of the width of a street, on the Building Acts Amendment Act of 1878, sec. 4, part 1, which defined the centre of the roadway as that "existing immediately before the time when first any house or building fronting towards or abutting on such road was begun"; but Mr. Youtlen, for the defence, called the magistrate's attention to the concluding words of sec. 6 in the same Amendment Act, which, he submitted, annulled any special force the preceding clause might have. Mr. Bros said the sections of the Act of 1878 seemed to contradict each other. In the particular case before him he had to decide if the forecourt was to be reckoned as part of the street or not. If it was surrendered by defendant, and was part of the street, the width was over 30ft., and the 8in. projection was not contrary to the Act; if it had not been surrendered, the owner was entitled to build as he liked on his own land, and the district surveyor had no right to interfere. In either case, therefore, he dismissed the summons.

**WHAT IS A NEW STREET?**—Messrs. T. J. Marshall and Co., of Campbell Works, Stoke Newington, were summoned at Dalston Police-court by the Hackney Board of Works for £54 2s. 1d., ordered to be paid by them by an order of apportionment made by the board in respect of the cost of paving a road known as Chapel-road, Stamford-hill, and which the board alleged was a "new street" within the meaning of the Metropolitan Management Amendment Act, 1862, Section 112. Mr. C. E. Jackson, solicitor, of Wormwood Chambers, City, defended. The defence was that Chapel-road, formerly known as Birdcage-walk, had, previously to the passing of the said Act, been taken into charge by the authorities having control of the pavements or highways in the parish of Hackney, and that, therefore, the Act did not apply to this case. Mr. William Lewis, an old inhabitant of the neighbourhood, proved that he remembered Chapel-road being maintained by the parish for the last 30 years, and that there had been houses during that period along the greater part of one side of the road. And Mr. James Lovegrove, C.E., the surveyor to the board, corroborated this, stating that the board had repaired the road ever since he was appointed in 1856, and that the defendants' property upon which the paving claim was being made was then old property. Mr. John Hamilton, of Wormwood-street, E.C., surveyor to the defendants, proved by the production of Ordnance maps that the property in respect of which the claim was made was in existence before the passing of the Act, and in the same state as it is at present. The magistrate said that, considering the evidence before him, he should decide that Chapel-road was not a "new street" within the meaning of the Act. The summons was therefore dismissed.

**WHAT CONSTITUTES NEGLIGENCE IN A SURVEYOR?**—CRABB AND OTHERS V. BRINSLEY—CRABB V. SAME.—This action, heard by Mr. Justice Denman and a jury on October 29, was brought by mortgagees for damages caused by the negligence of the defendant as a surveyor in giving advice as to advancing money on certain property. In November, 1882, the plaintiffs were applied to by one Tattersall for an advance of money by way of mortgage upon the security of leasehold premises in Leather-lane, Holborn. The

plaintiffs retained the defendant to act as their surveyor, and to report upon the value of the premises as a security for an advance of £2,000. The defendant accepted the retainer and made a report that the premises were ample security for £2,000. The plaintiffs, upon the faith of such report, advanced to Tattersall £1,500 upon a mortgage of the premises; but, so far from being worth £2,000, the premises were ultimately sold for £410. The plaintiffs claimed £1,735 for principal, interest, and expenses. The defendant denied the retainer by the plaintiffs, and alleged he was acting solely for Tattersall. He also denied negligence and other allegations in the statement of claim. The second action by one of the plaintiffs against the same defendant was in respect of a further advance of £1,500 on the same premises, and the two actions were tried together. Mr. Winch, Q.C., for the defendant, told the jury there were two questions for them—(1) was there an actual retainer by the plaintiffs to do the specific work for them? and (2) if the jury should be against him on that, did the defendant use due skill, care, and diligence in his advice? The defendant and a number of surveyors were called to sustain his defence. Mr. Justice Denman said the first question to be decided by the jury would be—Was the defendant employed by the plaintiffs as their surveyor? He was certainly employed by Tattersall, but sometimes, to save expenses, though it was not wise, both parties were advised by the same surveyor. The two actions were brought on two separate dealings, and it was possible the jury might find it was not negligence to advise the first loan of £1,500, but that it was to advise a further loan of £1,500. That belonged to the second question they had to answer—namely, if the defendant was employed by the plaintiffs as their surveyor, was he guilty of negligence in advising an advance of the first £1,500, and further of the second £1,500? The sort of negligence alleged was that the defendant failed to ascertain that the site was ill-adapted for erecting buildings on it for artisans, that the sanitary arrangements were bad, &c. Undoubtedly the estimate was a very high one as things had turned out. The plaintiffs said that not only was it wrong to advise that this sum should be advanced, but that the advice should have been that no money ought, under any circumstances, to be advanced on this class of property. The other side said that although it was now certain this property was not so good as it was estimated; but looking to the fact that it had been allowed to go into disrepair, and to the time the opinion was given—namely, 1883—the surveyors called for the defendant might have given the same advice without being guilty of negligence. It was the duty of the plaintiffs to make out that there was negligence. Then the next question was—Were the plaintiffs induced, by the advice given, to part with the money advanced? The jury found that the defendant was employed by the plaintiffs, but that he had only been negligent in advising the advance of the second loan of £1,500. Judgment for the defendant in the first action, and for the plaintiff in the second action—£1,500 damages.

**"ACQUIESCENCE" IN LIGHT AND AIR CASES.**—THIRSK V. MAYOR AND CORPORATION OF BEVERLEY.—(Court of Chancery, Oct. 25. Before Mr. Justice Field and Mr. Justice Wills.)—This was a special case stated by an arbitrator in an action brought for obstruction of light and access of air caused by a new corn exchange opposite to the premises of the plaintiff at Beverley. The plaintiff was a member of the town council from 1884 to 1887, and also chairman of the Property Committee from 1885 to November, 1886. The question in the case was as to whether his conduct as such chairman and in his public capacity in furthering the erection of these buildings was to be taken as an acquiescence therein, so as to disentitle him to recover damages. Mr. Lawson Walton appeared for the plaintiff; Mr. Channell, Q.C., and Mr. Scott Fox for the defendants. The arbitrator awarded the plaintiff £80 damages subject to the decision of the special case. The plaintiff was the owner of two shops on the east side of the Market-place, Beverley. At the back of these the defendants erected a new corn exchange, with public baths, engine-house, and tank over the latter. The tank was added as an afterthought, and was, in fact, the building which caused the injury to the plaintiff's light. The arbitrator found that the plaintiff as chairman of the committee and in the town council, "continually advocated and supported" the plans and drawings laid before the council on October 1, 1885, according to which the corn exchange was ultimately erected. It did not occur to the plaintiff or to anybody else until June, 1886, that any damage would be caused to the plaintiff's property by the new buildings. In June, 1886, the walls reached such a height as to cause damage to the plaintiff's property and that of a Mr. Dorsey, who, on June 10, made a claim for damages. No formal claim for compensation was made by the plaintiff till December 3, 1886, being the day after that when Mr. Dorsey's claim was settled. It was

urged for the plaintiff that he ought to succeed unless an acquiescence by him was proved by the defendants. Unless he knew the facts—namely, that his light would be diminished, there would be no acquiescence. The arbitrator had found that until June it did not occur to the plaintiff or anyone that damage would ensue. The plaintiff, moreover, acted solely in his public capacity, and ought not to be deprived of any compensation for damage to his private property thereby. The following cases were cited:—"Davis v. Marshall," 10 "C. B. N." S., 697; "Earl of Beauchamp v. Wynn," 6 "Eng. and Ir. App.," 223. For the defendants, Mr. Channell cited "De Bussche v. Alt," 8 "Ch. D." 314; "Williams v. Earl of Jersey," 1 "C. and P.," 61; "Willmott v. Barber," 15 "Ch. D.," 96, and argued that the conduct of the defendant amounted to an acquiescence in an equitable sense. Mr. Justice Field and Mr. Justice Wills held that the plea in the statement of defence was not made out. By consent the Court was to decide this, which was really a question of fact, and as they found against the defendants in this matter, there must be judgment for the plaintiff on the award.

**WIRE-WOVE NETTING AND THE BUILDING ACT.**—At Westminster Police-court, on Tuesday, the secretary to the Royal Aquarium Society appeared to an adjourned summons at the instance of Mr. E. Dru Drury, district surveyor of St. Margaret and St. John, Westminster, for an alleged infringement of the Metropolitan Building Act, 1855, by recovering the roof of the Aquarium building in Tottil-street, Westminster (formerly glass), with a material said to be combustible. The case was partly heard last week, as reported in our last issue, the evidence showing that the new roofing material, alleged by the district surveyor to be inflammable, consisted of a close wire mesh embedded in a translucent gelatinous preparation. Scientific and expert witnesses for the defence said the material was safer than glass, and Mr. Partidge advised the withdrawal of the summons. Mr. Drury, however, refused to accept the responsibility of such a course. For the defence, the following additional witnesses were now called: Mr. Walter Emden, M.S.A., theatrical architect; Mr. George Harkford, railway surveyor; Mr. G. H. Harrison, civil engineer; Mr. W. Ayres, builder, and others, who severally testified that the material employed in the Aquarium roof was practically fireproof. Mr. Emden said his experience convinced him that a glass roof was a constant source of danger. In places of amusement where it existed he had had wire netting put over, and, in some instances, under, because contraction and expansion caused breakage, and, in the event of fire, burning embers fell through glass without hindrance. Mottled glass would pierce anyone like a bullet. Mr. Partidge dismissed the summons.

**IN RE FREDERICK C. WINBY.**—The bankrupt, a civil engineer, at Palace-chambers, Bridge-street, Westminster, applied on Oct. 30th for an order of discharge. He originally began business as a mechanical engineer and contractor in 1864, but subsequently failed, and in 1882 he commenced as a tramway contractor with £4,500 capital. He attributed his failure chiefly to his inability to get Irish tramway contracts financed, and to his inability to carry out other contracts owing to want of capital. It was stated that he had laid out £10,000 on his contracts, and that he had discharged his liabilities under his former failure. Mr. Registrar Linklater granted the order of discharge, subject to a nominal suspension of three weeks by reason of the former failure.

## WATER SUPPLY AND SANITARY MATTERS.

**STREATHAM.**—At the half-yearly meeting of the Southwark and Vauxhall Water Company held on Tuesday, the chairman announced that they had got down to a depth of 1,161ft. at their well at Streatham. That was an interesting work for geologists, but it must not be forgotten that they were themselves interested in it only as a water company. If Professor Whitaker advised that there was a fair probability of water being found at a lower depth they might feel justified in spending more money to find it; but if his advice was against that probability, they would not go further. If, however, any scientific gentlemen were interested, and would like to go further, they could probably arrange for the use by those parties of the company's plant. As regarded the well itself, it was a success, for in the upper sand they had found a large supply of water. They had done their duty in searching for water, for if they could have tapped a boundless supply of water in the Lower Greensand it might have saved them laying the new 40in. main from Hampton to Nunhead, now in progress, which would cost between £80,000 and £90,000.

The Beith and Largs Road Trust has elected Mr. Roderick McDonald, Elgin, road surveyor under the Board.



## Our Office Table.

DURING the progress of excavations beneath an aisle of the nave of Millbrook Church, Beds, in preparation for the construction of new heating apparatus, one of the octagonal columns separating the nave and aisle fell, bringing with it portions of the arches on either side, with the clerestory and parts of the roof. The workmen had a very narrow escape. The pews and ancient font were destroyed by the collapse, which is attributed to sandy foundations. The *Standard* of Monday, in describing the accident, explains: "The church is a beautiful edifice in the perpendicular [*sic*] style, and is one of the oldest in Bedfordshire!"

At the examinations of plumbers for registration, held on Saturday at the City and Guilds Institute, South Kensington, applicants were present from several towns in North and South Wales, Somerset, Stafford, and Hants, as well as from various parts of London and the neighbourhood. The examinations included tests of joint-making, lead-laying, &c., and a set of questions relating to the qualities of material, the construction of various forms of house fittings, and the principles of sanitation. The examiners were Messrs. Hudson, Webb, Millis, Clarke, and Lyne; the two latter representing the Polytechnic Plumbing Classes and the United Operative Plumbers' Association respectively. Exactly half of the applicants succeeded in passing the examination.

THE death is announced, at the early age of 32 years, of Mr. John Cowell, A.R.I.B.A., architect and surveyor, of Canterbury. The deceased served his apprenticeship in the office of the former city surveyor, the late Mr. J. G. Hall, subsequently carried on business on his own account, and has still more recently been in partnership with Mr. Bromley, of Folkestone. Early in the present year Mr. Cowell suffered from measles and scarlet fever. From this he recovered sufficiently to resume work, but his constitution was weakened by the illness, and he succumbed on Saturday to an attack of typhoid fever. Mr. Cowell was employed in connection with the erection of the premises in St. George's-street, Canterbury, occupied by the East Kent and Canterbury Conservative Club, and also had charge of the restoration of Stodmarsh Church, just completed. On April 20th of this year we illustrated a Shelter on the Lees at Folkestone, carried out from Messrs. Cowell and Bromley's designs; and so recently as June 29 last we illustrated a house and shop in High-street, Canterbury, just completed, also from the designs of the firm. Mr. Cowell had been for the past seven years an Associate of the Institute.

THE Metropolitan Board of Works will receive a report from the Works Committee, at their meeting to-day (Friday), recommending them to include in their Bill of next session, powers to form a new road from Evelyn-street to Creek-road, Deptford, at an estimated cost of £55,000. It is also proposed to introduce into Parliament next year a Bill for the Amendment of the Metropolitan Management and Building Acts, such Bill to be upon the lines of the one laid before Parliament without success in the present year. The Bill for authorising the Board to raise more funds for the purposes of the Fire Brigade will also be reintroduced next year.

THE fifteenth annual competition between the various sketching clubs of London was held on Tuesday night in the rooms of the Royal Society of British Artists in Suffolk-street. The award of the judges, Mr. Frank Dicksee, A.R.A., Mr. Thomas Brock, A.R.A., and Mr. David Murray, A.R.S.A., was read by Mr. J. C. L. Sparkes. The award of honour was given to the Heatherley Sketching Club, which gained six out of the twelve competitions for the excellence of the works submitted. The first, second, and third prizes for figure compositions fell respectively to Tom Taylor, Kate Street, and M. Clifford, all of the Heatherley; those for landscape compositions, to E. A. Rowe and E. Fox, of Lambeth Schools, and Miss Homan, of the Heatherley; those for animal subjects, Miss Sowerby, of the Union Club; for design, P. Kemp, of Lambeth, and Miss Homan, of the Heatherley; for sculpture, J.

R. Essex, of South Kensington; A. Luchesi, and H. Fehr, of the Royal Academy Schools.

"ART and Decoration" was the subject of Professor Baldwin Brown's opening lecture at Edinburgh University, delivered on Tuesday, being an introduction to a course dealing with the general subject of the Fine Arts in their origin, history, and relation to human life as a whole. When the ordinary person thought of a "work of art," he generally, Mr. Baldwin Brown remarked, had before his mind one of the cabinet pictures or gallery pieces of sculpture familiar in exhibitions. But such were not typical forms of art. The cabinet picture was a comparatively modern invention. Both in painting and in sculpture the works of the finest periods of art in the past were of a decorative or monumental kind. Such, for example, were the frescoes of Giotto, Signorelli, Michel Angelo, and the sculptures of Phidias. These works of decorative art differed from the pictures and statues of our exhibitions in their public character. The cabinet picture was the production of an individual artist, and was destined to pass into the private collection of some patron. Its interest was wholly in itself—it was independent and self-contained; while the monumental or decorative work appealed more largely to the public. This public character in decorative art led to healthful co-operation of many workers upon a single task, and as appealing to the ideas and beliefs current in a community, such decorative undertakings had a fullness of intellectual and moral interest often absent from works carried out in the modern spirit. The lecturer urged the need for artists of education and attainments to turn their attention to the higher branches of decorative work. Now that there was no longer such a demand for cabinet pictures as there was ten years ago, there should be available a large amount of artistic talent for this great but neglected sphere of work.

### CHIPS.

The new public buildings at Darlaston, a Jubilee memorial, erected from designs by Mr. Jethro A. Cossins, of Birmingham, were opened on Wednesday.

The new Church of the Holy Cross at Berlin, opened by the Emperor William on Saturday, has been built from the designs of Professor Otzan, of that city. The Emperor afterwards unveiled the new fountain on the Schlossplatz, executed by Herr Reinold Begas, also of Berlin.

The approach to Alston Church has been much improved by pulling down the old cottages in the churchyard and erecting a new boundary-wall and entrance-gates, &c. Mr. Turner, of Alston, was the builder, and the architect Mr. Geo. Oliver, of Carlisle.

A carved oak chair, Perpendicular in style, has been placed in the sanctuary of Hughenden Church; it was executed by Mr. Glenister, of the Temple Works, who has also carved a stand for the lectern in acacia wood.

The Prince of Wales is to visit Middlesbrough in January to open the new town-hall, which has been erected from the designs of Mr. G. Gordon Hoskins, F.R.I.B.A., at an estimated cost of £120,000.

The corner stone of a new Conservative Club at Widnes, now in course of erection from plans by Messrs. Pierrepont and Fraser, of Warrington, was laid on Friday last. The building will be Elizabethan in style, will be faced with red bricks and terracotta for dressings, and will cost £2,500. Messrs. Sayce and Randle are the contractors.

A fresh appeal is being made by the Committee for the Completion of Truro Cathedral, the present application being for a sum of £5,600, the deficit still outstanding on the portions of the building consecrated last November, and which, if not raised before the end of the year, must be paid by the guarantors.

A memorial bust of the late University librarian at Cambridge, Mr. Henry Bradshaw, has been executed by Mr. Thornycroft, R.A., and presented to the University by the subscribers. The University has accepted the gift, and the bust will be placed in the University library.

The Bishop of Llandaff consecrated on Tuesday St. Saviour's Church, on the East Moors, Roath, near Cardiff. The architects are Messrs. G. F. Bodley, A.R.A., and T. Garner, the contractors Messrs. Stephens and Bastow, of Bristol, the style is Early Perpendicular, the walls are of local stone, and the cost has been £6,000.

## MEETINGS FOR THE ENSUING WEEK.

**SATURDAY (TO-MORROW)**—Association of Public Sanitary Inspectors. Annual address by the Chairman of Council, Hugh Alexander (Shoreditch). Westminster Town Hall. 6 p.m.

**MONDAY.**—Society of Engineers. "The Practice of Foundry Work," by H. Ross Hooper. 7.30 p.m.

Royal Institute of British Architects. Opening address by the President, A. Waterhouse, R.A. 8 p.m.

Royal Academy. Lecture on "Anatomy," No. 9. By J. Marshall, F.R.S. 8 p.m.

Clerks of Works' Association. Monthly Meeting, Carpenters' Hall. 8 p.m.

**TUESDAY.**—Leeds and Yorkshire Architectural Society. Opening Address by the President, H. Perkin. 7.30 p.m.

Manchester Architectural Association. Address by the President, A. H. Davies Colley. 7.30 p.m.

Glasgow Architectural Association. "Perspective," by A. R. Scott.

**THURSDAY.**—Royal Academy, "Chemistry," Lecture No. 1, by Prof. A. H. Church, F.R.S. 8 p.m.

**SATURDAY.**—Working Men's College, 46, Great Ormond-street. "Cornwall and the Cornish," by the Rev. H. C. Shuttleworth. 8.30 p.m.

**Architectural Association, 9, Conduit-street, W.**—The first lecture on the "History of Architecture" will be given by Mr. Stannus, at 9, Conduit-street, W., at 6.30 p.m. on Nov. 6, on "Greek"; that on Dec. 4 will be on "Byzantine," and the two others by Mr. Stannus will be on "The Varieties of the Renaissance."

THOS. EDWARD PRYCE, } Hon. Secs.  
FRED. R. FARROW, }

### CHIPS.

The Infectious Diseases Hospital, Northfield, is warmed and ventilated by means of Shorland's patent Manchester grates, supplied by Mr. E. H. Shorland, of Manchester and London.

On Saturday the new Town Hall at Burnley, erected on a site adjoining the Mechanics' Institution, Manchester-road, at a cost of about £40,000, was opened by the Mayor. The clock, which has four dials each 7ft. 2in. in diameter, and bells were supplied by Messrs. W. Potts and Sons, Leeds.

In connection with the Glasgow and West of Scotland Technical College, the first of a special course of lectures on "Hygiene for Architects and Builders" was delivered on Tuesday evening by Mr. Charles Gourlay, A.R.I.B.A., in the Science and Art Buildings, Bath-street, Glasgow.

Princess Louise has undertaken to open the new College of Science, in connection with Durham University, in Newcastle on the 5th of November.

New recreation buildings have been erected at the barracks, Caterham, and special attention has been paid to the ventilation, which is carried out on the Boyle system, the latest improved form of the patent self-acting air-pump ventilator being adopted for the extraction of the vitiated air.

**Holloway's Pills.**—The stomach and its troubles cause more discomfort and bring more unhappiness than is commonly supposed. These Pills have long been the popular remedy for a weak stomach, for a disordered liver, or a paralysed digestion, which yield without difficulty to their regulating, purifying, and tonic qualities.—[ADVT.]

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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1766.

FRIDAY, NOVEMBER 9, 1888.

## GENERAL BUILDING LINES— RECENT DECISIONS.

THE nice questions that are frequently brought before the Metropolitan Police Magistrates as to the widths of streets and projections under the Metropolitan Building Acts, arise generally from a strained interpretation of the sections of the Act. A great many of these questions might be settled without summons if there was some tribunal or assessor appointed to which or to whom a doubt between the district surveyor and the builder or his architect could be brought and speedily removed. The very important issue which the Clerkenwell Police Magistrate, Mr. Bros, had before him last week (reported in our last number, p. 593), as to whether a forecourt thrown into a street was to be reckoned in taking the width of such street, shows the need for some tribunal or court of appeal. It was purely a technical point to raise, and one that could have been at once set at rest by reading Section 6 of the Metropolitan Management Act Amendment Act of 1878. The question simply is, Whether a forecourt given up should be included or not in defining the statutory width of the street? As our metropolitan readers are aware, there is a rule which limits any shop-front to 5in. projection beyond the external wall in streets of less width than 30ft.; or to 10in. if the street is of greater width than 30ft. A Clerkenwell builder was summoned for having exceeded this rule in the erection of a house and shop at the corner of York-street and King's Cross-road. The shop front was advanced 8in. beyond the line of frontage, but this fact was not disputed. The question was whether the street was under or over the 30ft. in width. According to the plan shown in the court, York-street at this part has a forecourt on each side; on the side of the shop-front the forecourt measures 5ft. 11in., and on the opposite side of street it is 4ft. wide. Taking the total width of street from house-wall to house-wall the distance is 37ft. 8in., but deducting the forecourts the width is only 27ft. 9in., inclusive of the pavements. The plan also showed that the recent building line is set back 2in. from the old line. The district surveyor argued that the width was 27ft. 9in., and that, therefore, the shop-front could not project more than 5in., or, in other words, he contended that the forecourt which was to be thrown into the public way when the shop was completed, ought not to count, while Mr. Youlten, the architect of the new building, contended that the 5ft. 11in., the width of forecourt thrown in, ought to be included, as it was now used for foot traffic, and therefore the width of the street was over 30ft. in width, and he had, therefore, a right to come out the 10in. allowed by the Act if he liked. The subsequent hearing of the case, which was adjourned by the magistrate for consideration, turned on the interpretation of the fourth section of the Metropolitan Management and Building Acts Amendment Act, 1878, which defined the "centre of roadway" as that "existing immediately before the time when first any house or building fronting toward such road was begun to be constructed." For the defence it was argued that the last clause of Section 6 annulled the former part of the Section. It runs:—"Provided always that the preceding provisions of this section shall not affect the construction or extension of any house or building within the limits of any area which may have been lawfully occupied by any

house or building at any time within two years before the passing of this Act, or the construction or extension of any house or building lawfully in course of construction or extension at the time of the passing of this Act; and provided also, that the construction or extension of any house or building in or abutting upon any street existing, formed, or laid out for building at the time of the passing of this Act, may be begun and completed in like manner in every respect as if the preceding provisions of this section had not been made." This clause must be read with the former part of the section. From the facts before us there does not appear to be any other decision possible than that pronounced by Mr. Bros. The forecourt had been surrendered and given up to the public, thereby the width of the street exceeded the statutory 30ft., and it is fair that this surrender should be taken into consideration in giving the building owner the benefit of a few inches. If an owner gives up his forecourt to the public, it looks rather a hard bargain to tell him that his gift goes for nothing, and that he must not exceed the statutory limit for a narrow street by a single inch.

A still more general and important case was that of an appeal against an order of the Wandsworth magistrate directing the demolition of a house in Sugden-road, Clapham Common, under section 75 of the Metropolitan Management Act, which is to the effect that no building should, without the consent of the Metropolitan Board of Works, be erected beyond the general line of building in any street, place, or row of houses, in case the distance of such line of buildings from the highway does not exceed 50ft., or within 50ft. of the highway, when the distance of the line of buildings therefrom amounts to or exceeds 50ft., &c. The superintending architect had certified as to the general line of building in Clapham-road. The house in question was erected in line with the row in Sugden-street, but projected beyond "the line" in Clapham-road which was at a greater distance than 50ft. from that road. The house erected was less than that distance: hence the magistrate ordered its demolition. In the appeal Mr. R. O. B. Lane relied on the case of "Barlow and Another v. Vestry of Kensington," which had some points in common, though, as Lord Chief Justice Coleridge pointed out, that well-cited case differed from the one in question, inasmuch as the superintending architect's certificate here was distinct and final. Our readers will doubtless recollect that in the Kensington case the appellant's house stood at the corner of Kensington-road and De Vere-gardens; that the superintending architect certified that the main front of the houses in the Gardens was the general line of building, but did not decide that it was the general line of the row in which appellant's house stood. In short, the house alleged to have encroached on the De Vere-gardens line was not in De Vere-gardens at all, and therefore no offence had been committed under section 75. Such was the ruling of the House of Lords, which reversed the decision of the Court of Appeal.

Lord Coleridge, in giving judgment in the case of "Gilbert v. Wandsworth Board of Works," clearly distinguished between it and the De Vere-gardens case. The house faced Sugden-road, and it was, therefore, contended that it was in Sugden-road and not in Clapham-road; but the contention did not hold, as it was found that the building was situated in Clapham-road, and was within the building line, so that section 75 applied to it.

The decision will confirm the ruling arrived at in the Kensington case, which has clearly not been understood by builders and building owners who erect houses on corner plots. There can be no doubt of the intention of the Act that a corner building

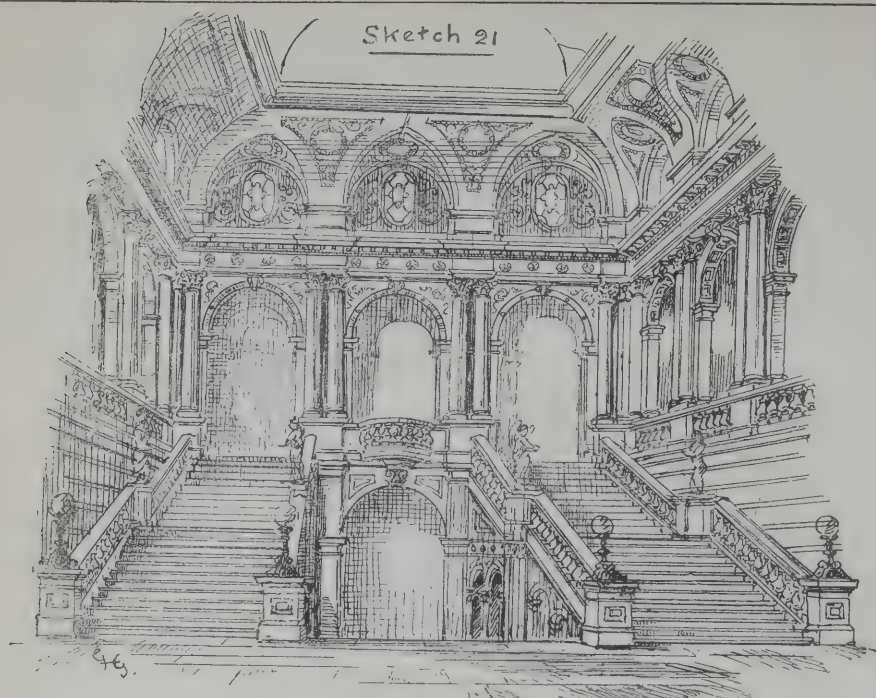
should set back to both lines of frontage. The Kensington case decided that a corner house could be in two streets, and therefore the fact of its being nominally in one could not be taken as precluding it from being in another. The "facing" of a house to one of the streets, or its entrance from that street, has been taken by builders as the principal consideration in determining in which street the building is. But, as the Judge said, to hold that a building was in the road it faced would be to nullify and render nugatory the intention of the Legislature: it would certainly defeat the main object of the section, which is intended to define a general frontage. In both the instances we have mentioned the intention of the framers of the Building Act is clear, and might have been administered with less difficulty, delay, and cost. As we have said before, the optional power given to the Metropolitan Board of Works, in regard to rules that ought to be binding on all alike, have tended to create a feeling that the restrictions may be relaxed, and upon this assumption advantage is taken by building owners. Unfortunately, too, there have been such conflicting precedents, and the superintending architect's functions have been in the past exercised with singular want of uniformity and lack of decision, if we take the case of houses allowed to be erected under the Hebb dispensation within a few feet of the roadway on Brixton Hill, in an inexplicable violation of the 75th section.

## HALLS AND STAIRCASES.—VIII.

VERY many artistically-arranged staircases have been the result of necessity in planning, and we intend to give a few instances of these. When the ground plan of a building is a parallelogram or square, the staircase is often placed in the centre, the chief apartments being arranged all round. When the stairs are so situated as to be axial, they can be lighted by a lantern or skylight, or may, as in several municipal buildings, as that of Sunderland, have an open area on each side, which lights not only the stairs, but the inner surrounding corridors. Here the entrance vestibule forms the base of a central tower to the main street front. Another arrangement of central stairs, in which the staircase is lighted through an open court behind, and the entrance is not in front, but at the side, is shown in the Great Yarmouth municipal buildings by Mr. J. B. Pearce, architect. Instead of lateral areas there is one open court behind of the same width as the staircase, lighting both it and side corridors. We gave a plan of this arrangement in our last article (Plan 19). The hall is separated by pilasters, and the centre flight is made imposing by its greater width and the circular ends or returns of the steps. The external row of pilasters carry the lines of the hall and corridor, and impart dignity to the staircase. A very well-considered type of hall and stairs is shown on Plan 20. Here the stairs is placed between corridors, and is lighted by an open court. The well-hole is inclosed by columns and pierced balustrades, a sketch of which is shown in section.

A stately and palatial class of staircase halls consist of a central flight branching off into lateral flights, surrounded by a gallery separated by columns or arches. Sketch 21 represents one of this class; the view being taken on the landing looking down the central flight of stairs. On the first-floor level corridors surrounded by arcades supported by coupled columns, and having a subordinate order carrying arches, are introduced, the whole of the staircase area being surmounted by a deep cove springing from the cornice, intersected by cross vaults or lunettes, and lighted by an upper lantern. One of the most recent and richest examples

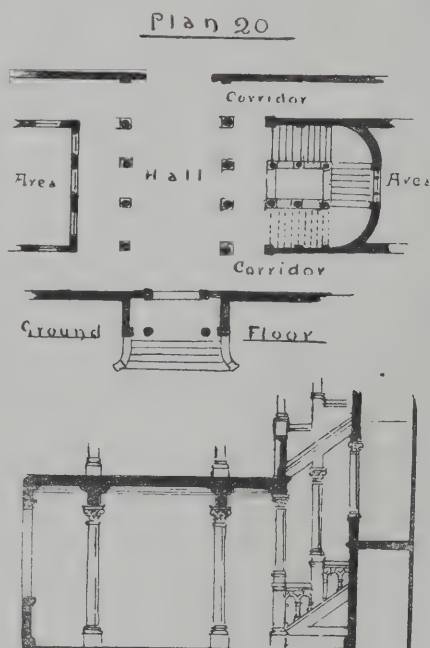




of this class is afforded in the magnificent staircase of the new Opera House, Paris, designed by Mons. Garnier, photographs and illustrations of which are numerous. The *l'escalier d'honneur* occupies a rectangular area of three bays square on plan. Two lateral flights lead to a spacious landing, from which a wide curvilinear shaped flight of stairs ascends with wing stairs to the gallery. The elegant and graceful lines of this staircase make it almost unique among great modern examples. The architect has introduced the ramping arch below the flights, and by curving the balustrades outward has given ease of ascent and grace of outline. Round the gallery rise coupled columns of red polished granite with Ionic capitals carrying entablatures and arches, above which runs a rich truss cornice. Over the cornice on each side are rows of lunettes, surmounted by the fine vaulted quadrangular domical ceiling, painted by M. Pils. Much of the grandeur of this staircase is due to the surrounding gallery, which impresses the visitor on ascending. The magnificence of the *escalier d'honneur* is heightened by the arrangement of the minor stairs and the open loggia and vestibule. As a model of planning the Paris Opera House stands pre-eminent. It forms a long rectangle, flanked by projecting annexes, which give such variety to its length. There are three parts or divisions symmetrically disposed to the major and minor axes: the stage, occupying the whole breadth of the building; the theatre proper or auditorium, forming the centre of the building, and including the grand staircase; and, lastly, the promenade and open loggia in front. The staircase hall forms a square and complete structure between the foyer or promenade and auditorium, and is surrounded by corridors. The plan of this building is an instance of the centralising mind of the French; every organic function is expressed in the structure. In a large public building the staircase performs an essentially distinct and public function, and too much prominence cannot be bestowed upon it.

As we are speaking here of central hall and staircase arrangement, we may mention a recent and very ingenious plan devised by Mr. Alfred Waterhouse, R.A., for the National Liberal Club. Some of our readers may have seen the building, and any description will be unnecessary to them. We may point, however, to the plan as an example of a clever utilisation of space in a building of irregular plan. The main corner entrance

between Whitehall-place and Whitehall-avenue gives access to a wide corridor or hall, making equal angles with those two oblique fronts, which leads into a central hall of elliptical shape, whose long axis is placed at right angles to the said corridor, and whose short



Section thro' Hall & Stairs



axis coincides with that of the corridor. The stairs, 8ft. wide, radiate round the farther and flatter portion of the ellipse. The ends of the steps rest on the outer elliptical wall, their inner ends resting on the colonnade, which is concentric, and is formed of various marble columns. These are in couples. On

the first landing are doorways in the outer wall, leading into the Gladstone library, dining-room, and grill-room. The light is admitted through a large lantern at the top over the well of staircase, which lantern occupies the irregular trapezium-shaped area between the four blocks of the building. What we have chiefly to notice in this plan is that the staircase occupies in the least wasteful manner the awkward space formed by the parallel back walls of the main building, the longer axis of the ellipse being coincident with the extreme angles. The effect of the open colonnade forming the well of the staircase is handsome and varied. The ascent is easy; the first and last risers are contained within one-half of the ellipse, divided by its longer diameter, the greater number of the steps traversing the flatter portion of the ellipse, so that every step in the ascent or descent is pleasantly varied.

#### SKETCHES OF ARMADA RELICS.

OUR sheet this week shows a few illustrations of the Armada Relics now on view at Drury-lane; coming, as it does, directly after Mr. Gotch's paper on "Queen Elizabeth and Victoria," it will, no doubt, prove interesting to our readers. There is a very representative exhibition, and many of the articles come from national collections in the Tower of London, the mansions of the aristocracy, and in the cabinets of the curious. The Exhibition was opened by the Earl of Winchelsea and Nottingham a short time since. The cross-bow shown is evidently an Italian piece of work, and was used by Queen Elizabeth. The little steel pistol was taken from the Armada. The peaked morion is a beautiful piece of work, engraved all over; it belongs to Baron de Cosson. There is a fine collection of armour and arms belonging to Mr. Edwin J. Brett, and representing many thousand of pounds. Sir Francis Drake's sword, shown, has his name engraved on it. The catalogue says the sword was discovered in Gloucestershire in a cottage; there seems to be no doubt of its authenticity. The Elizabethan Sword belongs to Mr. Seymour Lucas, A.R.A., whose studio we illustrated a short time ago. Drake's Chair is a massive-looking piece of old furniture, of good design and execution. The cup mounted in silver, the bowl made from a cocoa-nut, and the little crystal and silver ewer were lent by Mr. Edward Joseph. There are great numbers of prints, &c., in the collection. We saw some "pieces of eight," rendered familiar by Defoe's adventurer Robinson Crusoe. We believe we are correct in saying Mr. Augustus Harris has, under the direction of Mr. Seymour Lucas, reproduced, in the fine play "The Armada," some of the articles shown, and a drawing of that spectacle, by Mr. Herbert Railton and Mr. John Jellicoe, is lent to the Exhibition. One other thing we ought to mention as being especially interesting is the identical dress Queen Elizabeth wore when she went to St. Paul's to return thanks to God for the deliverance of her realm from the designs of Philip of Spain.

On Tuesday, October 30, the parish church of St. Mary Junior, Bishophill, York, which internally was in a very unsightly condition, was reopened, after undergoing a thorough cleaning, refitting, and decoration. The contractors were Messrs. Shepherdson and Son, of Driffield, and the decoration has been executed by Messrs. T. Hartley and Son, of York. The whole of the work has been carried out from the designs and under the superintendence of Mr. Temple L. Moore, of Hampstead, London.

The chancel of Christ Church, Gailey, Penkridge, having been rebuilt and enlarged by Mr. and Mrs. Ward, of Rodbaston, in 1876, has recently been improved by them, the work being entrusted to Mr. C. E. Kempe, of 28, Nottingham-place, W. The east window (three lights) and the south window (two lights), have been filled with stained glass. The subject of the east window is, in the upper part, the "Crucifixion"; the lower part being filled with three scenes from the history of the "Resurrection." The south window contains figures of SS. Peter and Paul. The internal walls of the church have also been decorated in colour. Special rededication services were held in the church last week by the Bishop of Lichfield.





CARVED · WOOD · CROSS · BOW



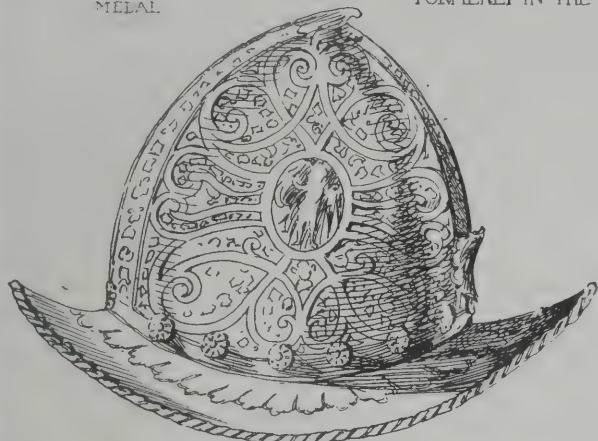
MEDAL



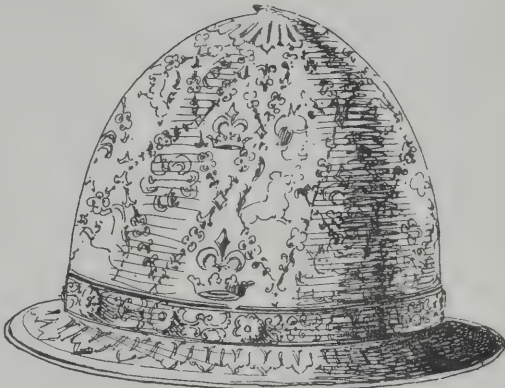
STEEL PISTOL WITH KNIFE BLADE  
FORMERLY IN THE MEYRICK COLLECTION



REVERSE OF MEDAL



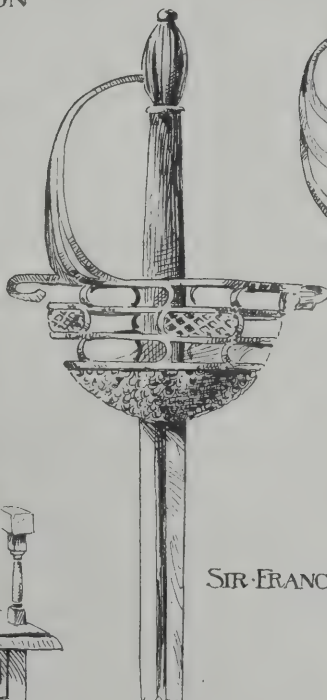
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SIR FRANCIS DRAKE

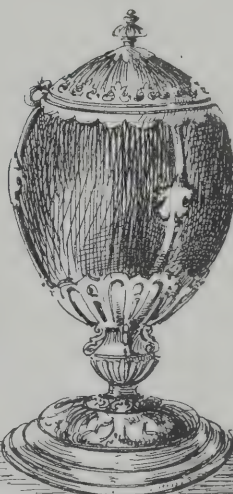


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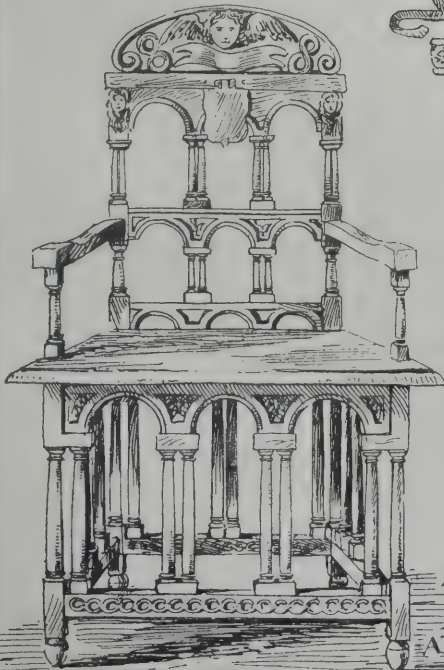
ELIZABETHAN  
SWORD



DRAKE'S SWORD



ELIZABETHAN CUP



SIR · FRANCIS · DRAKE'S CHAIR

SKETCHES · OF · ARMADA · RELICS  
AT THE DRURY · LANE · EXHIBITION 555.



CRYSTAL AND · SILVER · GILT · EWER



# ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE inaugural meeting of the present session was held on Monday evening, the President, Mr. Alfred Waterhouse, R.A., in the chair.

## THE NEW BY-LAWS.

The HON. SECRETARY read a correspondence that had taken place between the hon. solicitors to the Institute and Mr. C. L. Peel, secretary to the Lords of the Privy Council, with reference to the draft of the proposed by-laws under the new Charter. Mr. Peel wrote on June 30th that the Lord President of the Council was advised that in two points the by-laws were defective—1. No provision was made for the examination of Associates in accordance with Clause 4 of the Charter of 1887, nor, indeed, was the passing of such examination required by any of the proposed by-laws. 2. By Clause 65 of the by-laws the conditions of competition for prizes, &c., were left to be defined by the Council of the Institute, whereas Clause 34 of the new Charter required these matters to be dealt with in the by-laws. The Lord President was advised that the by-laws ought not to be approved by the Privy Council until the deficiencies mentioned were supplied. The hon. solicitors replied, calling attention to sections 3 and 4 of the Charter, which appeared to the Council of the Institute to provide for examinations, and as to the rules for competitions, it was impossible to describe these in detail in advance. In deference, however, to the views expressed by the Privy Council, Clause 2 of the by-laws had been amended, an addition made to Clause 41, and a new one substituted for Clause 65. Mr. Peel rejoined that the amended draft did not sufficiently meet the objections raised in his previous letter, and the omissions would have to be supplied before the by-laws could be approved.

## MR. J. E. SAUNDERS.

The PRESIDENT: It is my duty, in accordance with by-law 24, to announce that by a resolution of the Council unanimously passed on the 30th of July last, pursuant to by-law 23, Mr. James Ebenezer Saunders, Fellow, has ceased to be a member of the Royal Institute of British Architects. The announcement was received with loud applause.

## PRESIDENTIAL ADDRESS.

Mr. WATERHOUSE then delivered the inaugural address. The most important event of last session was undoubtedly the passing of the new by-laws under the provisions of the supplemental Charter granted last year. The chief feature of this new instrument was the examination (no longer voluntary, but obligatory) through which for the future the ranks of Associates would have to be recruited. This was an immense stride in the right direction, first as an incentive to the student to study, and secondly as showing him the direction in which he ought to study; pointing out to him the sources from which he can acquire the knowledge necessary to pass the examination with credit to himself. There has hitherto been in architectural pupils not so much a want of will to study diligently as an uncertainty as to the way. The way was now made clear, and from the commencement of his articles the student of the future would know, if he cared to know, what he had to make for, and accomplish, before he would be recognised as one fit to practise as an architect. This was likely to be of incalculable advantage to the profession. Passing to the question of Architectural Registration, the President said that an ill-timed and, as he thought, most uncalled-for Bill had been introduced into Parliament last session, by means of which architects, engineers, and surveyors were all unceremoniously to be huddled together in one Act of Registration. The Bill would, if carried, instead of narrowing the several professions interested to their most competent members only, have tended, for a generation at any rate, to injuriously widen them by giving a certain legal status to those who otherwise could have no claim as fit to practise in any of them, and in this way would have done incalculable mischief. The whole scheme had been a beginning at the wrong end. Education, not registration, was what was needed. Let the student pass the Institute examination creditably, and so become an

Associate and Fellow of the Institute. He would then be a registered architect in an effective use of the term. He believed that architects wanted no other registration, and ought to be content with nothing short of it. The new Local Government Act had not made any provision for the proper examination of technical officers employed by the urban and rural authorities. The Council had done its utmost to call attention to this defect while the Bill had been under consideration, but without success. Provision had been made to secure the proper qualification of medical officers to be employed by the county councils, and it was obvious that the surveyors, urban and rural, should also be persons whose fitness for the very important duties they were called upon to perform had been in every case properly attested. The Imperial Institute building was making progress from Mr. T. E. Collcutt's plans, and promised to be an imposing structure. It was a matter for congratulation that in this case there was a likelihood of having a public building which would be fairly seen, at any rate on two sides; though had it been placed on the north side of a square instead of being set back from a road 90ft. wide, its effect would have been enormously enhanced. The idea of sacrificing anything in the way of space for the sake of architectural splendour and effect seemed foreign to the English nature. On the Continent, as for example in the Palais de Justice at Brussels, and Baron von Hansen's new Parliament Houses at Vienna, things were better ordered in this respect. On the other hand, the domestic buildings of this country were without rivals elsewhere. Let an English country house, erected from the designs of any architect who had made a reputation for such work, be compared with a modern French château, or even with Viollet le Duc's published ideal, and the superiority of the English work was evident. America seemed very near us in this matter. She had certainly surpassed Europe in the originality and boldness in some of her buildings for other purposes, but the English home was still unrivalled in its quiet attractions. Returning from country to town, the schemes for the improvement of communication in London left much to be desired. The effect of new streets on adjacent buildings ought to be carefully considered, and if unsatisfactory, means should be taken to investigate the awkward blemishes thus occasioned. The subject of our unfair and oppressive law with regard to the rights which one neighbour may acquire over another's property by putting out windows overlooking the latter, and so restricting its use as a building site, demanded attention. If it were gone about in the right way and with sufficient energy, an Act might be passed removing, to a certain extent at any rate, one of the greatest sources of annoyance and expense incident to building in towns. In Scotland no such vexatious restrictions exist, and in America there was similar freedom. In France, too, the difficulties of the building owner were as nothing compared to what they were here, though he was subject to the very proper regulation that the extreme elevations of buildings lining streets should bear a certain proportion to the width of the street. The unreasonable enjoyment of light which a dominant owner might have been blessed with for a certain period, simply because his neighbour had delayed the exercise of his own rights during that period, should be no cause why he should be left in undisturbed possession of such unreasonable enjoyment for ever, to the detriment of his neighbour and his successors. Unfortunately the length of time that the present law on the subject had run presented serious, but not insuperable, difficulties in the way of an alteration. Having referred to the losses the profession had sustained by death during the year, to the recently-published biographies of G. E. Street and H. H. Richardson, and the new books written by Prof. Hayter Lewis, Mr. Phené Spiers, and Messrs. Graham and Ashbee, Mr. Waterhouse continued: The important questions of direction and design of new streets, the law of light and air, the heights of new buildings and their relation to the width of the street—are all subjects pre-eminently fit to be submitted at no distant date for the consideration of the new Council of the County of London. There are, however, other questions of like importance as far as we architects are concerned, which we can, if we choose, of our

own will settle, or, at least, bring to such a point as will conduce to a future settlement, when our profession is perhaps in a more homogeneous condition than it is at present, and when uniformity of professional practice will be regarded as necessary to the position and welfare of the members of a liberal profession. The first duty of the Institute is to guard the honour of the profession—to take care that its members do nothing derogatory to their professional character; or, at the worst, that they shall not do so with impunity. I am not now alluding to illicit or surreptitious commissions or allowances, or of the offers sometimes made of something by way of consideration for employing certain people or their wares on our clients' works. I trust that such malpractices are of the past. When any of us undertake duties of public trust, whether it be in an honorary or a paid capacity, in any office or on any council or board, we ought to scrupulously avoid using our position for any private ends or gains, whether as professional men or as individuals. In an address delivered nearly ten years ago from this chair, at the opening of the session for 1879-80, the late Mr. Whichcord referred to the Metropolitan Board of Works and the professional men who might be members of it in the following terms:—"Architects," he said, "may be elected members of that Board just as barristers, solicitors, and doctors may be so elected. It would be ridiculous to say that professional men shall not sit at that Board because they may have had a pecuniary interest in some of its building transactions. But I shall run no risk of censure when I say that a Fellow or an Associate of this Institute, if he be elected a member of the Metropolitan Board of Works, ought not, from that moment, to have any professional connection whatever with the purchase of land offered for sale or lease by the Board; nor should he be professionally engaged in the superintendence of buildings to be erected on land which is the property of ratepayers whose agent and representative he is." The late Mr. Street, in 1881, repeated those words; and the advice they offer, the warning they convey, may be advantageously studied by all who aspire to sit on the new County Councils. If the Institute is still to flourish—if the character of the profession is to be maintained—it must be by jealously raising the standard of conduct of the individual members. We need not despair of success in stamping out abuses if only we are convinced of the necessity of so doing, and are earnest in the endeavour. Something, at least, has been done within the last few years to render architectural competition less liable to unfairness and jobbery than before. There is another point of professional practice in which we might probably see more justice done than at present. We are in the habit of regarding the bills of quantities issued to competing builders as final instruments incapable of containing error unless the successful builder finds it out between the day on which he sends in his estimate and the day on which he signs his contract, which may be the day after. Are we in these matters as scrupulous as we ought to be that justice be done to the builder? His lot, owing to the severity of the competition to which he is generally subjected, is a sufficiently hard one, without our making him practically responsible for other men's errors. Our Scotch brethren measure up the work after completion, though competed for in the ordinary way on preliminary bills of quantities. If we are not prepared for that, let us at least be willing to allow for the correction of errors in taking out the quantities, when it is obvious that omissions have been made. There would be obvious convenience in uniformity of usage in this matter and in other points of professional practice also: for instance, great divergence of opinion exists as to whether an architect is bound to give more than one set of drawings, or of tracings of his drawings, for the use of the works. I have until lately adhered to the view that he is not; but the great facility now offered by the ferro-prussiate sun-printing and other processes enabling us to reproduce any number of copies of a tracing without the possibility of error, and thus saving all trouble of examination, puts this question in a new light. Two things are obvious, the necessity of receiving payment from the builder for additional copies of draw-



ings should be done away with, and uniformity of practice in this matter should be aimed at. The great number of drawings required by municipal and other corporate authorities is also a considerable tax upon us or our clients, and it would be well if such bodies could be persuaded to take mounted sun copies instead of tracings on cloth. Then there is the desirability of a more general application of the arbitration clauses (Nos. 20 and 21) of the Heads of Conditions of Building Contracts. There are architects who put in the building contracts they make, as the agents of their employer, a clause to the effect that the architect is to be sole judge, arbitrator, or umpire in any dispute which may arise between the two parties; but no man can be fairly or safely judge and party in the same case. We have heard something lately of the conflicting terms "professional man" and "artist" as applied to the architect. Now in my opinion the true architect is both. In speaking of an architect as an artist I do not mean that he is to be a clever draughtsman merely—far from it. A man may be the most exquisite of draughtsmen, and yet be entirely deficient in the critical sense of what it is that makes a work of architecture beautiful. While not neglecting to cultivate our powers of delineation, we might perhaps do more to make those powers of use to us than many of us do at present. If, for instance, instead of sketching ancient examples so much, we were content to do half as much in this way, and afterwards were to endeavour to reproduce our sketches and scale drawings from memory, we should accomplish two things—marvellously sharpen our observing powers, and greatly increase our facility in design. We should make the building we are studying our own; it would be in our heads and not merely in our sketch-books. And, further, if time could be spared to analyse the sources of our satisfaction in the object of our study, to take notes of its excellences or defects of plan, construction, and detail, that time would not be lost; though we might have less to show to admiring friends. I wish it were possible to discover not merely what our prize holders draw during their tours, but what they have learnt, what they have assimilated, what has become part of themselves. Our reverence for the excellence of our forefathers' work, and our delight in what has been superadded to that excellence by the finger of Time, making it yet more lovely, is a characteristic of our own day, and will induce us to deal tenderly with old work when it comes under our care. But there are now, unfortunately, not many buildings left upon which the architect and workman can exercise their forbearance and show their reverence for the "charm of mutilation and the fascination of decay." It may be proper to enlarge, add to, or even pull down old work for new, but surely never to endeavour to make old work look like new. Occasionally we may see our way to replace old work when research has made clear to us what it was originally, as Scott did at St. David's, and as Mr. Pearson is doing at Westminster Hall. Such cases must, however, be exceptional. It is certain that the past did not respect its own past as we do ours, and our practice, commendable as I think it, has, no doubt, its dangers. If we are for ever dwelling on the past, we shall not be self-reliant; and if not self-reliant, we shall never be bold originating architects. We may love and reverence the past as archaeologists, but as architects let us not forget that archaeology is the bane of living progressive architecture, and that if our art is ever again to evoke popular enthusiasm, it must do so by embodying the thoughts, the aspirations, and the genius of the living people for whom we build.

A vote of thanks to the President for his address, proposed by Mr. EWAN CHRISTIAN, and seconded by Mr. T. J. FLOCKTON, President of the Sheffield Society of Architects and Surveyors, was carried by acclamation.

#### BATTERSEA FREE LIBRARY COMPETITION.

THE plans for the new public library, buildings to be erected on a site facing Lavender-hill, for the parish of St. Mary, Battersea, have this week been on view in the

Lammas Hall, Bridge-street West, and the award of the Commissioners has now been confirmed. The conditions and instructions for the use of the architects invited to compete were issued as long since as February in the present year, and the designs were sent in early last May. The delay in arriving at a final selection has been due to the determination of the promoters to obtain tenders first in order that the stipulated sum should not be exceeded in carrying out the chosen plan. "Knowledge is Power" (in red) found the most favour with the committee, who were advised as to matters of cost by Messrs. Hunt and Steward, quantity surveyors. Mr. E. W. Mountford, of 22, Buckingham-street, Strand, the author of this design, was provisionally instructed to prepare the working drawings, and bills of quantities were furnished, with the result that some twenty-eight tenders have during the past few days been received, only two of which are above the price named as the limit of cost; this will be seen by the list which we print among the tenders in to-day's BUILDING NEWS. Mr. Mountford has, therefore, been elected architect, and Messrs. Holloway, of Lavender-hill, S.W., are to be the builders, their estimate being £5,600. Three prizes were offered to the competitors, besides one of £30 to the chosen architect, which amount is to merge in the usual commission. These were £25, £15, and £10 respectively, and the amounts have been thus awarded, Messrs. T. Chatfield Clarke and Son, second prize; Mr. Rowland Plumble, third prize; and the fourth prize has been given to the executors of the late Mr. Charles Jones, who has died since the drawings were submitted.

The accommodation required in the new building has been ingeniously contrived by several of the competitors, and, on the whole, their designs are eminently creditable. We have no doubt whatever that the best plan and most suitable elevation have been determined upon, though it is equally certain that the angle bay now proposed to be added to the corner of the Lavender-hill façade is necessary to make the front effective. At present the alterations made in the original elevation, at the wish of the committee, give the building a bald and crude appearance just at that point where some emphasis is highly desirable, to preserve the unity of the composition. Beyond this the bay will materially improve the librarian's apartments, and give interest to the newspaper reading-room. The style adopted is in the popular brick treatment, with shaped gables and projecting pilasters, simple strings and cut cornices inexpensively devised, and designed to not needlessly clash with the adjoining houses, which are of the speculative builders' type of work. This is a consideration of no mean importance, provided, of course, that the new building is made to look like what it is. Not a few of the competitors failed entirely in this respect, and furnished designs either manifestly too grand for the situation, or too like private dwellings in style. The principal entrance in the selected plan is placed to the left in the Lavender Hill front, under a boldly treated arch between two projecting bays, which terminate above the main eaves level in shaped gables, as before mentioned. The hall seems the least successful part of the planning, and the absence of a porter's office or standing place from whence visitors may be seen on going in or out of the building is clearly an oversight which other public libraries have found it necessary to make provision for. The news-room to the right-hand of the vestibule gives 1,030ft. super., and is a good room, though the librarian cannot command nearly the whole of it from his office adjoining. Not that this official can always be surveying the readers, but it should be possible for him to do so at any moment. The magazine room is placed on the left of the entry, and contains 890ft. super. floor space, or 40ft. more than stipulated. The lending library is situated at the rear, and the borrowers' counter lobby faces the entrance conveniently. Above this is the reference library (area 1,900ft. super.), with galleries round and a skylight above. Below in the basement is a book store of greater area still. A way at one end of the lending library is contrived to reach further buildings, should the intended extensions on the adjoining vacant land be

carried out. As, however, the accommodation provided in the present plans is for 150,000 to 200,000 books, and the library only consists now of some 20,000 volumes, there is but little likelihood of any extension being necessary for very many years to come. The librarian's room is placed between the lending library and newspaper room, and adjoining it is a private staircase and hall entered from the Green-lane front to the residence of the librarian on the first and upper floors. Along the main façade over the entrance is a reference book store connected with the reference library, and above this again is a good gallery for art classes with a north light or additional room for book storage. The ladies' reading-room is placed over the librarian's office. The staircase is well considered in connection with its landing and with reference to the entrance. It is also well lighted. The w.c. and lavatory accommodation is not roomy enough, and though two closets may, perhaps, be enough, the arrangement of such places and their lobbies need not be cramped.

Messrs. Chatfield Clarke and Son have, curiously enough, adopted the same motto, "Knowledge is Power." The two designs are, however, totally dissimilar. The second prize composition is very French in style, well suited to a Parisian boulevard, but much too grandiose in effect for a site on Lavender-hill, Battersea; besides, the building is too expensive in character, and we fancy some of the other competitors better deserved the position awarded to this design for that reason, seeing that they have endeavoured more closely to limit the cost of their designs to the required sum. Messrs. Clarke and Son have, however, spared no pains to submit a taking set of drawings, with interior as well as exterior perspectives. Their plan, too, in many ways is a good one. The entrance is dignified, though we do not quite like the staircase right and left of it, while the hall is too small, and would be rather dark. The librarian's room is too isolated, and the borrowers' lobby to the lending library takes the form of a long passage way entered from one end—a most awkward arrangement. The librarian's house is not nicely planned in its details; but the reference library is a fine apartment, and the book stores are convenient. "Adsum" is the motto of Mr. Rowland Plumble's design, which takes the third prize. His building has square-looking rooms, and an attendant's room commands the hall and news-room admirably; but the borrowers' lobby to the lending library is too cramped, and the reference library is not large enough as compared with the space devoted to book storage: indeed, we think the plan shows want of study, and, coming from Mr. Plumble's hands, we should have expected more attention to minor points of detail. No provision is made for reaching future extensions to the rear of the premises. The w.c. accommodation is here better contrived than in either the first or second plan. The caretaker's bedrooms and kitchen are in the basement. The entrance porch looks ugly, and the general treatment externally seems to us somewhat too pretentious. The entrance is from Lavender-hill. A good ink perspective and nicely got-up drawings illustrate the design. "Victor" ranks fourth; but the author, Mr. Charles Jones, has, unfortunately, died since he prepared this design. The entrance, reached from the angle, is ingeniously contrived, with a quaintly-treated tower over it. The design is too complex, though picturesque, notwithstanding the high-shouldered portico. The open yard dividing the lending library from the news-room cuts up the space very badly. "Education," said to be a design by a South Shields architect, furnishes an ideal plan from a librarian's point of view. It is based on an oval form for the reference library and reading room, round which radiating bookcases are placed in the irregular-shaped book-stores making up the site covered by buildings. This is on the first floor. Below, the lending library is placed on the right-hand hand of the entrance, very well managed, and detailed with considerable care, and also knowledge of librarian's requirements. The staircase is also well placed. A glass dome covers the library, and every available space is made use of for storage. The architecture is very indifferent, and the elevations are over-windowed and commonplace. "Thistle" is the device masking a crude plan





but pretty elevation, with plaster-fronted upper stages and a circular tower at the angle. There is a good reference library, and anyone so nearly doing a good thing ought to have done better. "Literati" is the motto of an odd, over-glazed front of meaningless appearance, masking a by no means bad plan. The hall is excellent, and the librarian has a separate entrance. "Indicator" is clever, no doubt, but his plan and elevations are crowded in effect and too overdone to be admirable. "Control" has a practical looking arrangement, though wanting in study of its parts. The borrowers' space is needlessly curtailed, and the librarian's entrance, combined with that of the caretaker, are instances of poor planning. The elevation is neat, and would look well in execution, being unassuming, though lacking a central feature rather. The drawings are well executed. "Knowledge" is a poor performance, though in plan it resembles some of the better ones. The elevation need not be described, nor the faults of the perspective mentioned.

#### BOTZEN CHURCH.

THIS church is by far the most beautiful in the South Tyrol, and certainly contains all the characteristics of this district, and being on the main Brenner line, is more accessible than such churches as are found at Meran, &c.

It is full of rich monuments carved detail, and most interesting tracery. The glazed tile roofing, in brown, yellow, green, and white, is seen here to perfection, and the tower and traceried spire are unique.

W. H. SETH-SMITH.

#### STRAINS.—VII.\*

By G. A. T. MIDDLETON.

METHOD OF DESIGNING A WROUGHT-IRON GIRDER (continued).

HAVING thus determined the section of the top flange, it will be found that the bottom flange may be made similar (the material used being wrought iron). The rivet holes here have to be deducted, as the tensional strain has to be conveyed by the remaining metal past the rivets. Two rivet holes occur in each sectional area of flange, the rivets being necessary to attach the angle irons to the plates; and another rivet is used to attach the angle irons together through the web. Though this is not in the same transverse section, it is considered in practice safer to deduct the area of the hole. If  $\frac{5}{8}$  in. rivets be employed, the total area thus deducted from the bottom flange is  $1\frac{1}{8}$  in., leaving an effective area of 10 in. —  $1\frac{1}{8}$  in. =  $8\frac{7}{8}$  in. to resist a tensile strain of 40 tons. This it is more than capable of doing, as wrought iron will

bear 5 tons per square inch safely in tension. Thus, if the top flange be designed to meet the compression brought to bear upon it, a similarly constructed flange will suffice for the bottom. There are many practical advantages in building both flanges alike, the principal one being that there is no risk of error through the workmen, in setting the girder, placing the wrong flange uppermost.

The shear in the web is but little, being only 10 tons over either abutment, and diminishing towards the centre. As the iron will stand 4 tons per square inch in shear safely, only  $2\frac{1}{2}$  sq. in. of metal is required in the web, and this is much more than supplied by its being made  $\frac{1}{2}$  in. thick, thinner than which would be valueless against possible corrosion and buckling. Stiffeners would also be provided as precautions against buckling, and would consist of L irons of the same size as those used to attach the flange plates to the web—3 in. by 3 in. by  $\frac{1}{2}$  in. In small girders, such as the one we are now considering, packing pieces of scrap iron have to be inserted under the stiffeners to save a troublesome fold round the angle irons of the flanges. The stiffeners are placed about 4 ft. apart, their actual position being determined by the exigencies of the case, one always being placed over the edge of each abutment.

Fig. 48 shows an elevation over the bearing, and Fig. 49 a section made up from these data. It will be noticed that the rivets are spaced at 4 in. centres, as is usual in England; that the bearing is nearly  $\frac{1}{3}$  of the span, and that the flange plates and L-irons are carried round the ends. The depth of 15 in. is between the flange plates, or as nearly as possible that between the centres of gravity of the flanges, considering the L-irons to form part of these.

Having thus determined the form of the smaller girder, we will proceed to the larger. The depth of this, between the centres of gravity of the flanges, may be assumed as 27". The strain at the centre due to the distributed load of  $1\frac{1}{4}$  tons per foot run, is, therefore, by the usual formula of  $S = \frac{Wl}{8d}$ .

$$\frac{40 \text{ tons} \times 32 \text{ ft.}}{8 \times 2 \cdot 25 \text{ ft.}} = \frac{1,280 \text{ ft.-tons}}{18 \text{ ft.}} = 71\frac{1}{3} \text{ tons.}$$

Set this up to scale over the centre of a line representing the girder (Fig. 50), and complete the parabolic outline of intermediate strains.

Half the distributed load on the small girder is carried by the larger girder at the point C. This is equal to 10 tons, and the strain over the point C in either flange is found, as explained in Chapter III, thus:—

$$S = \frac{\text{Reaction at A due to load at C} \times \text{distance A C}}{\text{depth}} = \frac{3\frac{1}{2} \text{ tons} \times 20 \text{ ft.}}{2 \cdot 25 \text{ ft.}} = \frac{75 \text{ ft.-tons}}{2 \cdot 25 \text{ ft.}} = 33\frac{1}{3} \text{ tons.}$$

Set this up over C (Fig. 50) to the same scale as that used to set up the  $79\frac{1}{3}$  tons over the centre, forming the triangular outline of intermediate strains, as explained in Chapter IV. The triangular and parabolic strain outlines must next be summed, by adding together the ordinates of each at all points to the line A B, thus producing a new outline of total strains due to both the fixed and distributed loads, as shown by the thick line in Fig. 50.

The greatest strain in either flange is thus seen to be produced over the point C, where it is equal to  $66\frac{2}{3}$  tons (due to distributed load) +  $33\frac{1}{3}$  tons (due to fixed load), making a total strain at C equal to 100 tons.

In the compression flange, therefore, at four tons to the square inch, an area of 25 in. of metal is required to meet the strain at the point C.

Of this, two 4 in. by 4 in. by  $\frac{1}{2}$  in. L-irons would contain  $7\frac{1}{2}$  sq. in., and the remaining  $17\frac{1}{2}$  sq. in. would be more than contained by one 16 in. by  $\frac{1}{2}$  in. plate, and one 16 in. by  $\frac{1}{2}$  in. As a matter of practice the thicker plate is usually placed next the L-irons.

The distance of 100 tons, scaled on Fig. 50, can now be divided proportionally to the areas of angle irons and plates, the first plate extending, with the angle irons, over the whole span; but the second plate being stopped, for the sake of economy, one rivet hole beyond the point where it overlaps the firm outline of total strains.

The second plate is thus less than 20 ft. in length, and so can be made in one piece; but both the first plate and the angle irons have

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obvious that the plates and cover between them would be capable of conveying the total strain, and no fear need be entertained either of the rivets shearing, as all from the end of the cover would assist in their resistance.

From the joint in the angle-irons to the far end of the cover, however, the full complement of nine rows as here ascertained would be required to transfer the strain back again to the angle-irons.

The cover plate would thus contain a total of 20 rows of rivets at 4in. pitch, and would be 80in. in length. It would occur as near to the centre of the girder as circumstances would permit, its position being indicated on Fig. 50.

In larger girders it is often possible to make use of surplus metal lying outside the total outline of strains (Fig. 50) to reduce either the area of cover plate or distance between joints, while in many cases a top plate can be slightly lengthened to serve the purposes of a cover by breaking the joints near to its end.

The greatest shear in the web is over the abutment B, where it is equal to  $10 \text{ tons} \times \frac{1}{2} + \frac{40 \text{ tons}}{2} = 26\frac{1}{2} \text{ tons}$ . At 4 tons per square

inch this requires a sectional area of 6½in. to meet it, which is much more than contained by a web of 27in.  $\times$  ½in.—the smallest obtainable.

The girder may now be considered complete, its section being as shown in Fig. 52, which also shows the connection with the cross girder, presuming that the top flanges are required to be on the same level. The cross girder, it will be noted, is connected to the web of the main girder, so as to avoid producing a torsional stress, the connecting rivets containing enough metal to resist, as a shear, the proportion of weight transferred from the one girder to the other.

The stiffeners can be arranged upon a somewhat better system than had to be adopted with the cross girder, it being now possible to bend them across the main angle irons, and so to do away with the objectionable packing pieces. Where the web requires to be jointed, T instead of L iron stiffeners are employed, the table of the T forming the cover plate.

(To be continued.)

#### NINETEENTH CENTURY ART SOCIETY.

AMONGST the collection of pictures in the gallery of this Society we notice a few good landscapes, including one by Marmaduke A. Langdale (10), wrapped in a November atmosphere, in which the brown leaf and mellow colouring of autumn are faithfully depicted. A pretty river view at Brentford, by William Matthison (38), Charles Stuart's fine subject "October in the Torrent Walk, Dolgelly" (59), and his "Gleam of Sunshine" (107), A. Ballin's "Meadow by the Brent" (64), in nice subdued colour, and the feeling work of Edward Henry Holder, in his landscape "Buttermere" (112), also a "Bit of Welsh Scenery" (185), are amongst this class of subject. In the latter, the gleam of sunlight playing through the glade of foliage and the roadside is cleverly handled. S. J. Barnes in "A Glimp of Sunshine" (173), and Hamilton Marr in a "Misty Morning" (168), have chosen two different aspects of English landscape. The vigour in the handling of Harry V. Inglis's "Showery Weather, Rudgwick, Sussex" (169), is a protest against many vapid works near it. Nor can we pass from landscape work without mentioning Will Anderson's bright twilight piece, No. 90, where the dark cottages and landscape are set off against a clear evening sky. Arthur C. Dodd is a skilful delineator of canine character. "A Free Lunch," where two dogs are doing their best to partake of a cold joint left on a table outside an inn, is clever in its handling; and two other pictures may be noticed for their truthfulness. William E. Norton (26), in "Fair Wind," has realised, as far as he can on canvas, the effect of that transporting element on a sailing craft. There is freshness, too, in the picture. Near it Ada Bell paints delicately a vase of chrysanthemums. Richard S. Marriott, one of the enterprising secretaries of the Society, sends several pictures and sketches. "The Path Across the Common, Hayling Island," a small study near Broadstairs, "Autumn" (88), view in North Wales (19), "Ellen's Isle" (195), are well-

selected subjects, and display a keen sense of natural effects. G. A. Williams's "Ice Cart" (46), and a view on the Barmouth Coast (78), are both skilfully painted. Albert Kinsley (56) has a cleverly-treated picture "Demanding Toll," a rustic bridge and stile, guarded by a youth who clearly wants to steal a kiss from the girls coming along the meadow. Philip F. Walker has an ambitious composition from Tennyson's poem "Elaine," where the "dead steered by the dumb went upward with the flood." There is some fine Turner-esque colour in the water and castled heights. E. M. S. Scannell's "Gladys," a portrait of a little girl (69), is nice in tone and expression. The large picture, "Entre Nous," a garden scene, by Arthur L. Vernon, with three ladies on a terrace and a young gallant behind them, is artificial and too mannered; and by far the best work of figure composition is Edward Patry's picture hanging at the end of gallery, "The Trysting Place," representing a full-faced, fresh-coloured young lady, attired in a Directoire costume, wearing a large-brimmed hat, standing by the seashore, letter in hand, awaiting her lover. The open countenance, and eyes looking steadfastly out from the canvas, and the colouring of the dress and background, make a pleasing subject. Robert Gallon (123) contributes "Water Meadows," pleasing in the light and trees. We also note works by C. B. Yates (127), C. F. Holland (157), H. M. Page (163), and one or two impressionist views, such as that by Julius Olsson (188). In the water-colour gallery we notice a few redeeming works, some nice drawing and colour by Arch. Webb (227) in his view "Near Dordrecht," and "Shoreham" (330); a luminous view of "Venice," morning effect, by Fred. Burgess (319); "A Grey Day, Hampstead" (233), by J. Loxham Browne; "Christ-church," by L. Leslie Brooke; some bold handling and pure colour in Richard H. Nibbs's drawing of "Niton, Isle of Wight" (255), and his clever study of "Barge" (264); Chas. Low's "Surrey Lane" (251); and some drawings and studies by Thos. J. Soper (259), S. D'Onseley (269), A. Canella (276), W. Richardson (372), and A. Quinton (369).

#### BOOKS RECEIVED

*The Natural History of Local Boards* (London: Simpkin, Marshall, and Co.) is a manual intended, as it publishers say, "for the use and diversion of those whom it may concern, and especially for legislators, administrators, and ratepayers." The author of this volume comes forward as a satirist on local boards, and gives us a series of ideal portraits, or seven types of boards. They are certainly no caricatures, but presentments of everyday experience in local board administration. The types are respectively dealt with under the names of the Progressive Board, the Forcible Board, the Fighting Board, the Experimental Board, the *Laissez-Faire* Board, the Compulsory Board, and the Contentious Board. The lessons drawn from these several boards are practical and true, the result of experience. How many local boards are portrayed under the remarks of the "Fighting Board," the strife and envy of self-seeking, at times careless, at others wasteful and lawless! The Experimental Board, too, represents faithfully too many boards who are composed of men who do not understand engineering or sanitary work. The *Laissez-Faire* Board also depicts in true colours the æsthetic and let-alone policy which too often rules. There is a good deal of quiet humour in these pictures of the weaknesses and sins of local boards, and there is much food for reflection in the facts recorded. Corporate officials, clerks, surveyors, and engineers will be able to verify for themselves these portraits of boards, and perhaps add to the number of illustrations. We agree with the author that to have good boards the electorate must be intelligent and unselfish. The electorate must first reform themselves before they can obtain a good board. —*Theoretical Mechanics*, by J. EDWARD TAYLOR, M.A. Lond. (London: Longmans, Green, and Co.), is an introduction to the study prepared on the lines laid down by the Science and Art Department's elementary stage. The illustrations and worked examples are clear and concisely stated. The chapters on Force and the Parallelogram and Polygon of Forces,

Parallel Forces give the student good ideas of these highly important propositions. The principle of "work" is explained, after which the Mechanical Powers are dealt with, and chapters follow on the Law of Motion, Energy and Accumulated Work, Hydrostatics, Pneumatics, and Pressure of the Atmosphere. As a handbook to the young student, Mr. Taylor's little treatise contains all that is necessary. —*Ipswich, Past and Present*. Under this title, Mr. William Vick, of Ipswich, is bringing out a monthly series of platinotype photographs illustrative of the buildings and scenery of that town and its neighbourhood; each issue consists of three 6in. by 4in. pictures, placed on impressed mounts 8in. by 10in., and is published at 1s. 6d. to subscribers, or 2s. to non-subscribers. Part I. is now before us, and gives a bird's-eye view of the north-eastern portion of Ipswich as seen from the Town-hall; the well-known red brick entrance to the College projected by Wolsey, but never completed; and a detailed illustration of a grotesquely-carved 16th-century angle-post in oak in Northgate-street. The work will form a valuable record of the present appearance of many interesting bits in a county town which is losing some of its more quaint features by the march of modern improvement. —*Information*, a new journal "for all classes," makes its first public appearance on the 8th of November. Judging from the advance copy before us, it has the promise of success. The contents range from illustrated articles on "Royal Residences" and on "Early English Journalism," to musical and dramatic criticism, and notes on current events. A chess column will appeal to the many admirers of that "king of games." —*Practical Geometry for Science and Art Students*, by JOHN CARROLL, Art Master, Hammersmith Training College (London: Burns and Oates, Orchard-street, W.), is the 10th edition of an improved treatise on geometry, in which the study is treated in a more rational manner than has been attempted in other works of the department. For instance, the author brings together those problems depending for their solution on a certain principle, instead of dealing with them separately. Thus the Euclidian principle, that the angle contained in a semicircle is a right angle, is the basis of eight problems which are dealt with in one page. Another advantage of the book is that the diagrams face the page referring to them. The figures are clearly engraved, the lines of construction being finer than those intended to show the completed figure. Plane figures, scales, geometrical drawing, and solid geometry are given in a series of lessons to which sections on orthographic projection and graphic arithmetic are added. The work has been approved by the Science and Art Department, and adopted by the London School Board.

#### CHIPS.

There has just been erected in Wiston parish church a memorial window representative of the three Christian graces—Faith, Hope, and Charity. The window is by Messrs. Ballantyne, Edinburgh.

The sewage precipitation works which have been constructed by the Accrington and Church Joint Outfall Sewerage Board, at Church, were opened on Monday by the Mayor of Accrington. The works have been over two years in construction, and have cost £26,000, equal to 11s. 6½d. per head. Mr. Eli Knowles, borough engineer, Accrington, was the engineer.

Plans have been prepared by Messrs. Paley and Austin, architects, of Lancaster, for the erection of the proposed new church, St. John's, Cloughfold, Rawtenstall. The estimated cost of the church, which is to contain 500 sittings, is £5,000.

Messrs. Clark, Bunnett, and Co., Limited, of Rathbone-place, are constructing three hydraulic lifts for the new addition of Guy's Hospital. They have also in hand hydraulic lifts for the General Post-offices, London and Liverpool; the Bank of England, Threadneedle-street, and the Royal Courts of Justice Branch; the Gaekwar of Baroda, &c.

The Duchess of Teck laid on Wednesday the foundation stone of a new church about to be erected at Kingston-on-Thames, from designs by Mr. Kelly. Mr. W. H. Gaze is the contractor.

On the site of a theatre destroyed by fire at Blyth, Northumberland, in February last, a new one is being built to seat 1,800 persons. Messrs. J. and W. Simpson, of Blyth, are the contractors.





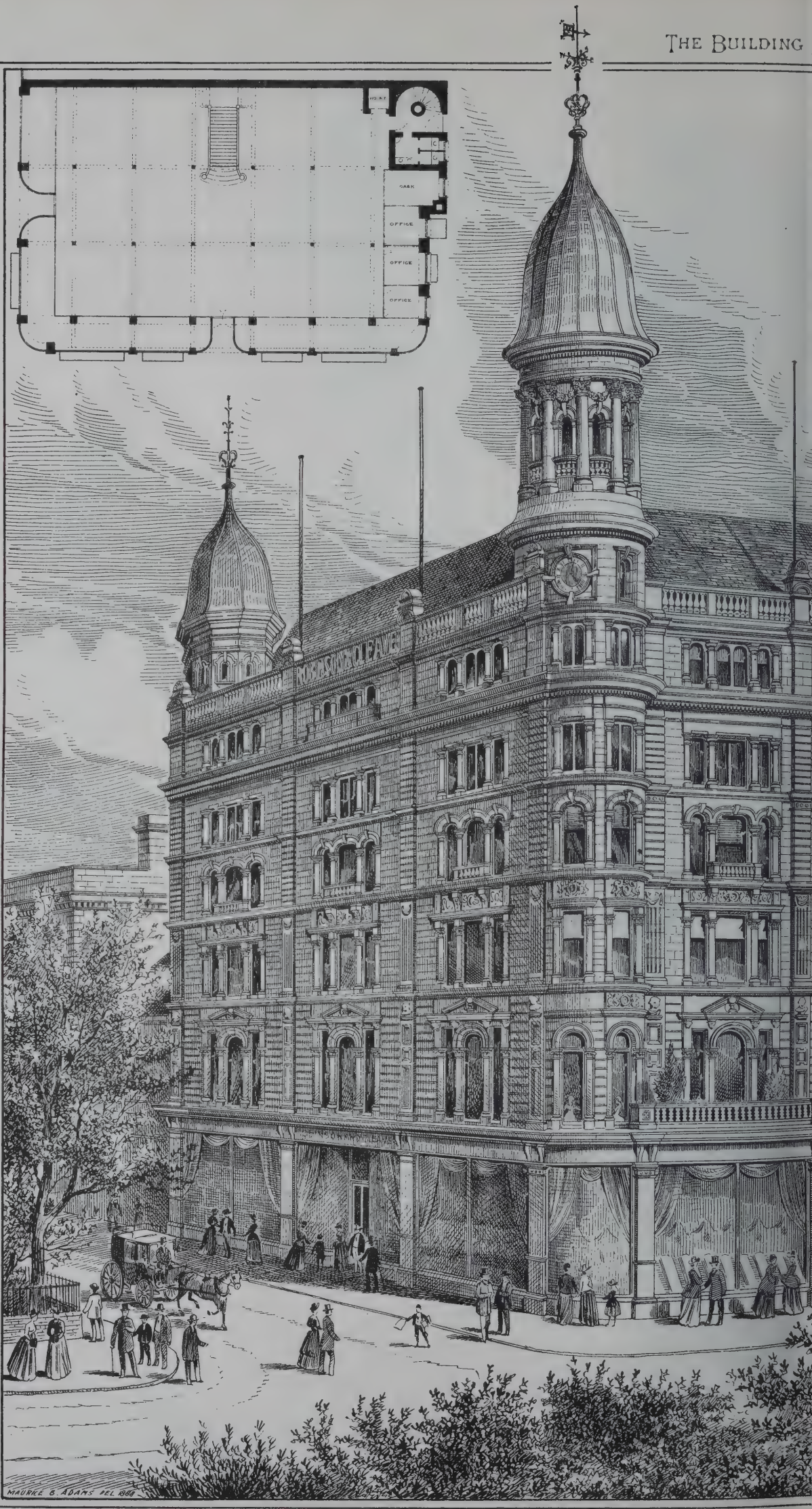






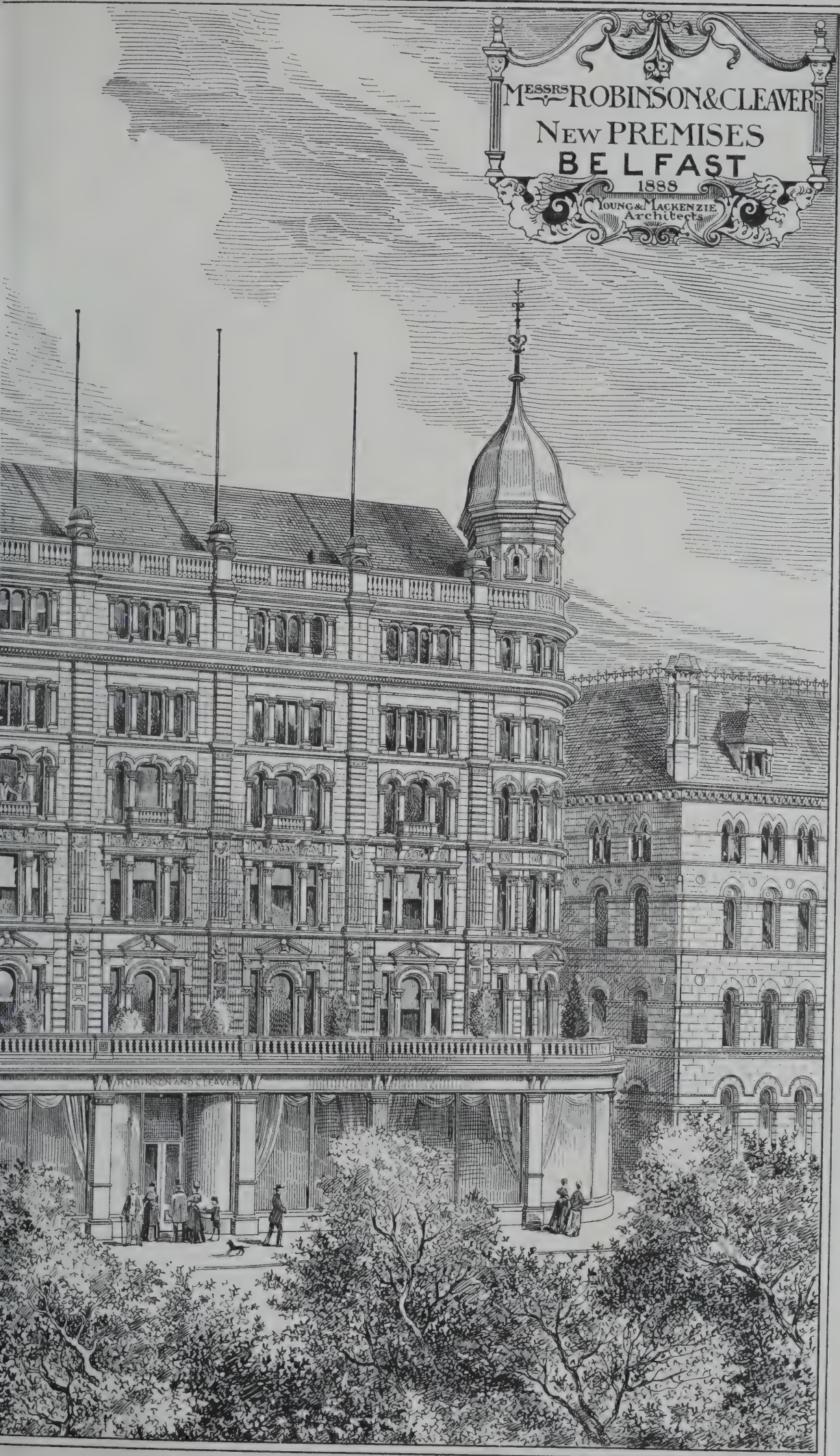








Nov. 9. 1888.



MESSRS ROBINSON & CLEAVERS  
NEW PREMISES  
BELFAST  
1888  
YOUNG & MACKENZIE  
Architects



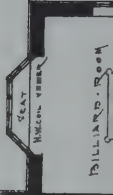
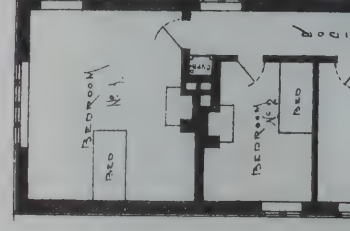
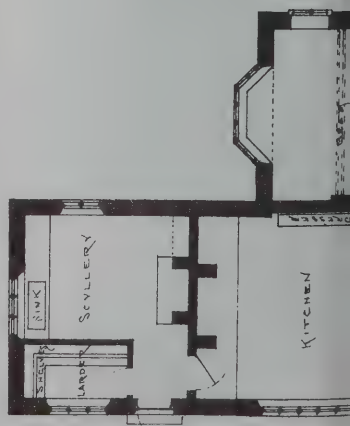








HOUSE AT GODDEN GREEN NEAR SEVENOAKS  
FOR THOS. L. DE VILLIERS ESQUIRE.



SEAT  
GREEN VERGE  
BILLIARD ROOM





GROUND FLOOR PLAN.

FIRST FLOOR PLAN.



THE GARDEN FRONT  
VIEW FROM THE TERNIS LANE



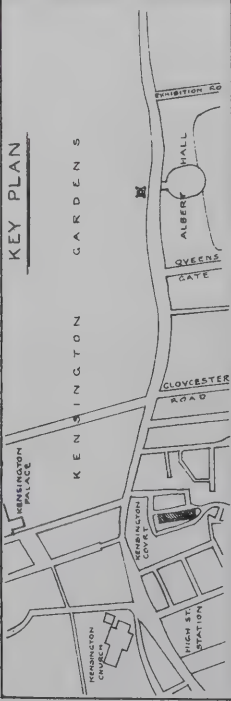




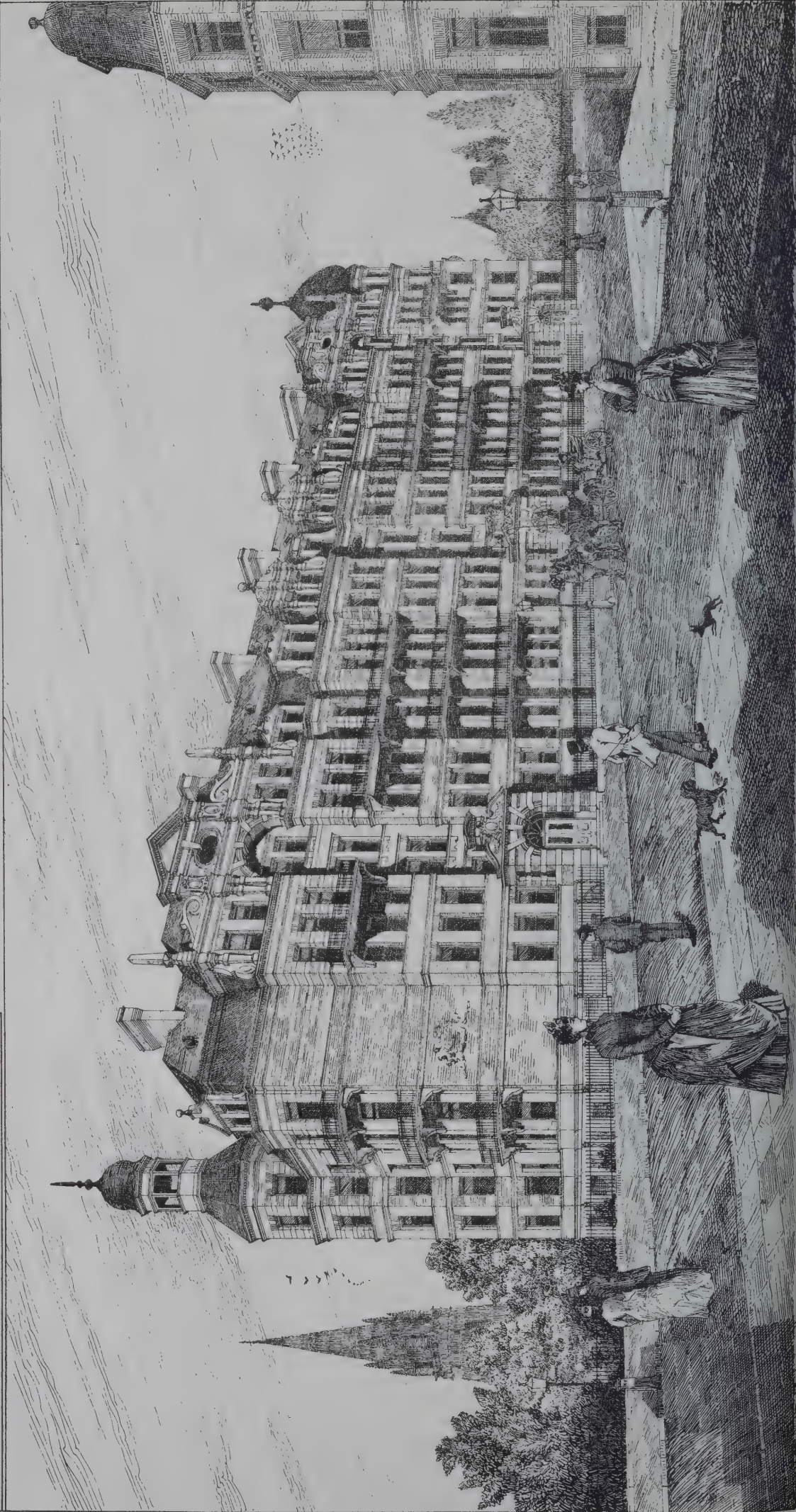
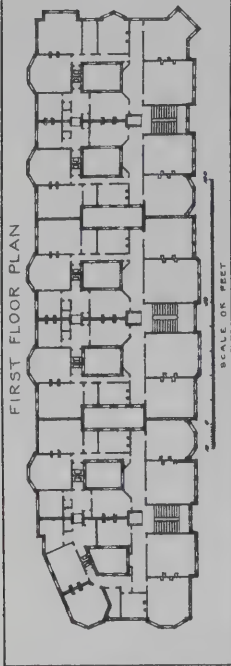




# THE BUILDING NEWS, NOV. 9. 1888.



**KENSINGTON-COURT MANSIONS**  
 RESIDENTIAL FLATS  
 NOW BEING ERECTED FOR  
**F. BAYNES. ESQ.**  
 PERRY & REED  
 9, JOHN STREET ADELPHI ARCHITECTS  
 1888

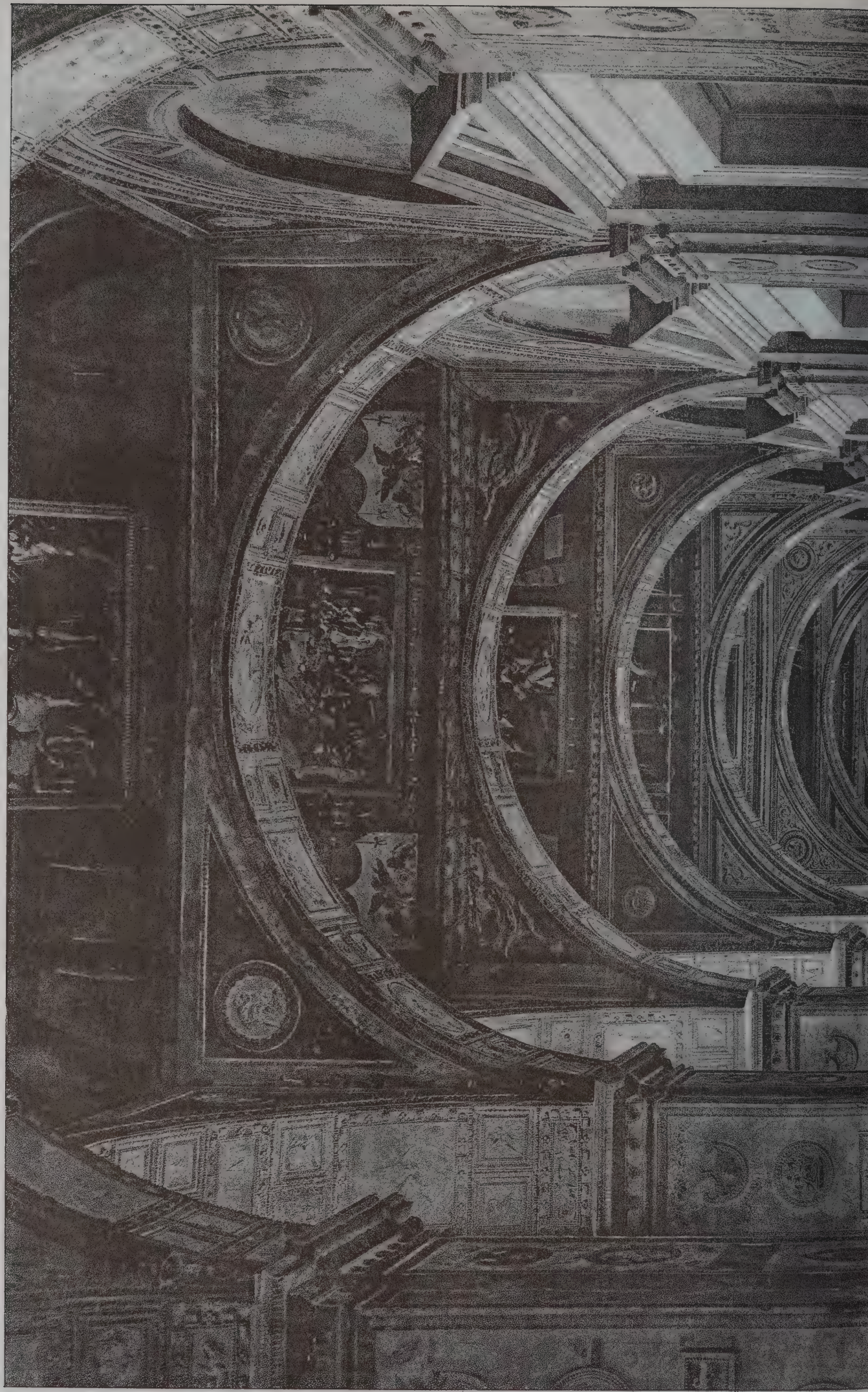








THE BUILDING NEWS, NOV. 9, 1888.







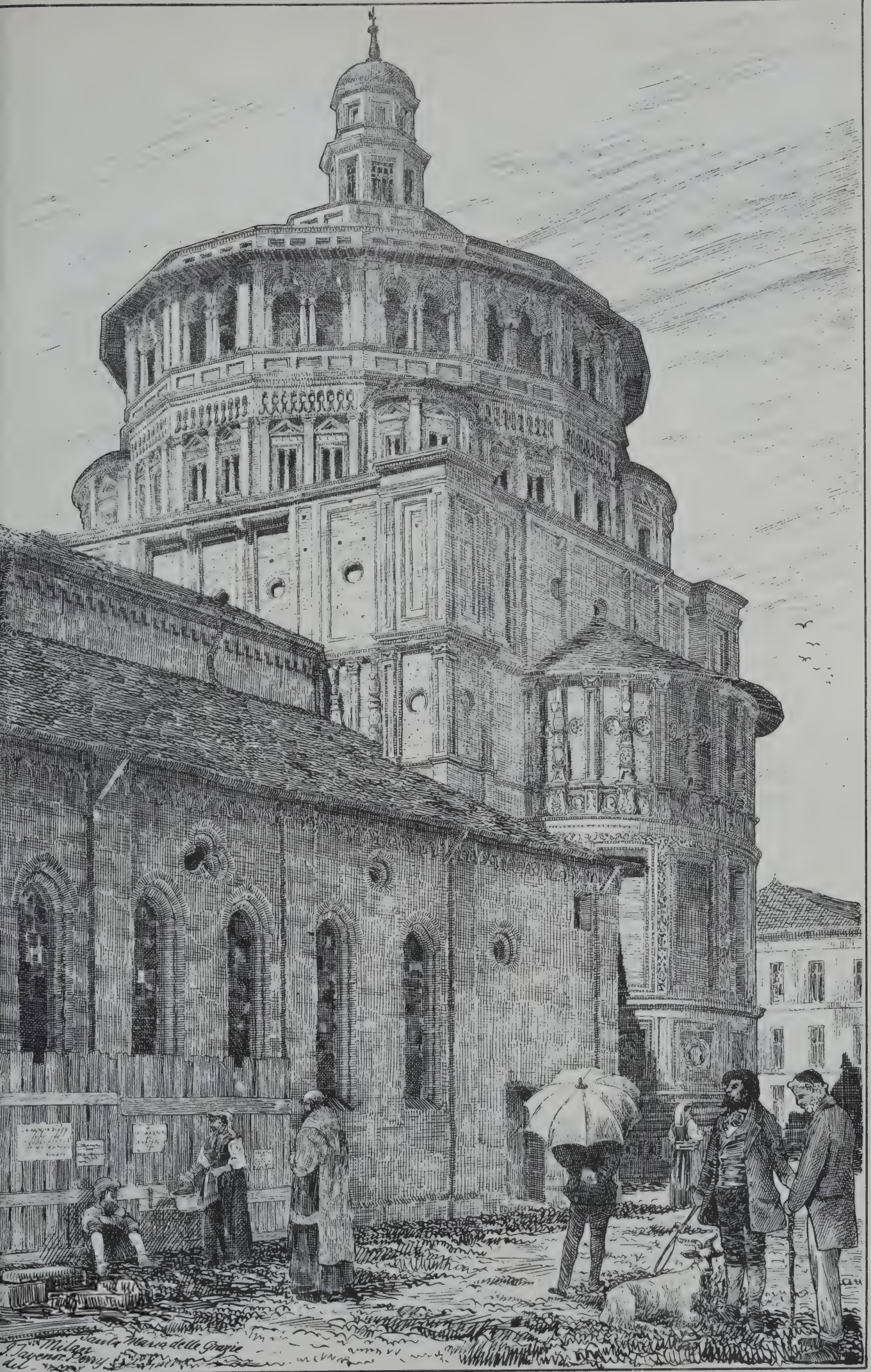
"PAPER TINT" BY JAMES ALGERMAN, 2. Queen's Chapel, London

THE LOGGIA OF RAPHAEL, THE VATICAN, ROME





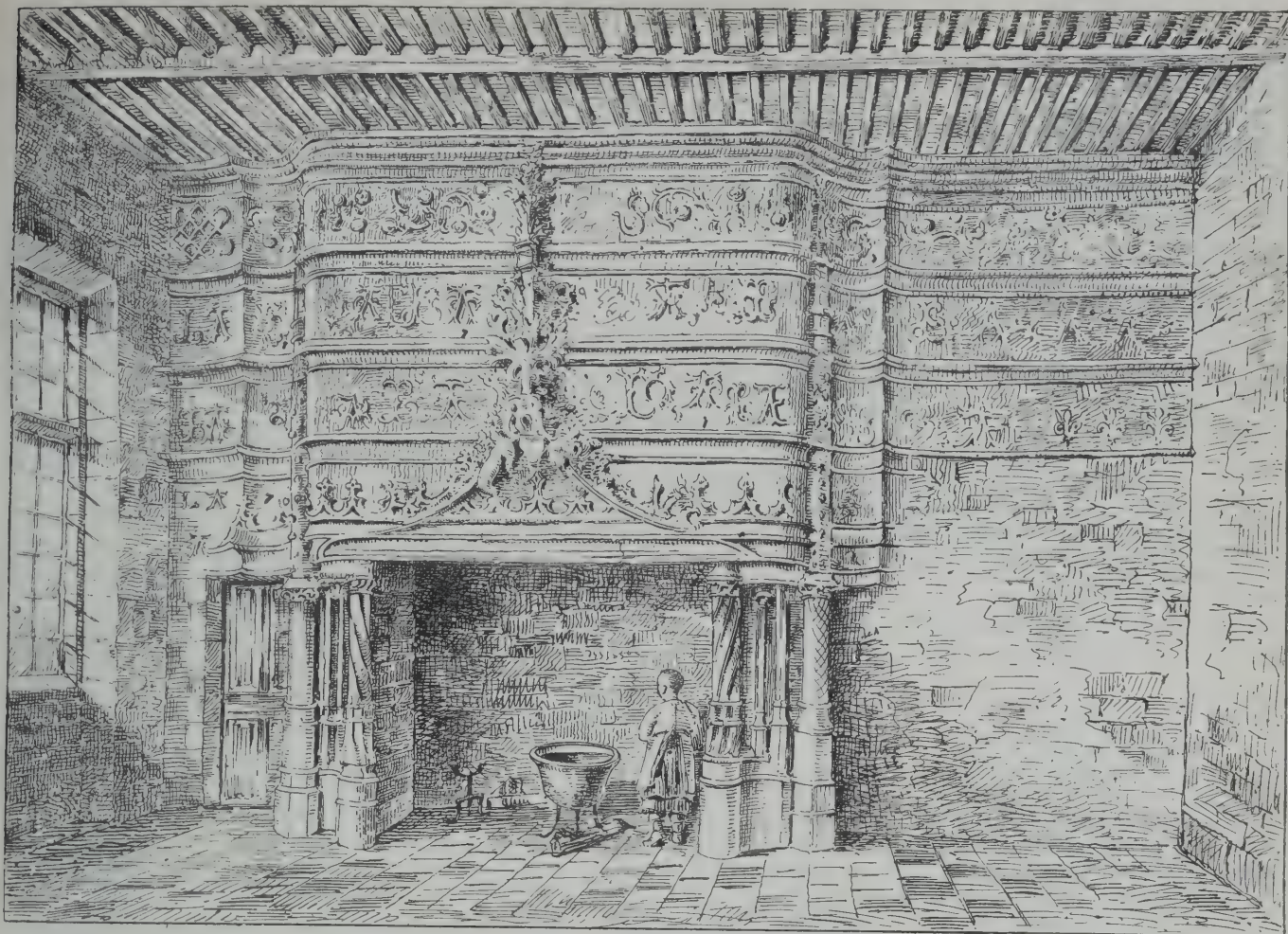












*Old Chimney Piece, Chateau de Losse, Dordogne, France.*

#### COMPETITIONS.

**MILAN.**—We hear that no final award has yet been made in respect to the Cathedral competition at Milan, though rumour states that the design of Sig. Beltrami, of Milan, has been chosen for the first prize of 40,000 francs. The paragraphs hitherto published, purporting to give the decision of the committee, are incorrect, and the list of prizes therein given do not tally with the conditions of the contest. There are to be four awards of 5,000 francs as second prizes, three awards of 3,000 francs, and seven prizes of 2,000 francs to the designs placed fourth in merit. Mr. Alfred Waterhouse, R.A., P.R.I.B.A., has been unable to attend the committee meetings held in connection with this the final competition. The statement that Sig. Brentano, of Milan, is to be intrusted with the work has not been confirmed.

**NEWPORT.**—The Newport United District School Board having some time back advertised for designs for new schools at Spring-gardens, Newport, Mon., to accommodate one thousand children; designs from several local architects were submitted. After several meetings of the Board, they reduced the number to two designs, these being subsequently forwarded to a leading architect (under motto), who decided in favour of the one submitted by Mr. E. A. Lansdowne, of High-street, Newport, Mon., which design the Board afterwards unanimously adopted. Tenders received for the carrying out of same appear in this week's issue.

A stained-glass window of two lights and tracery has been placed in St. Paul's Church, Whitley, near Newcastle-on-Tyne, in memory of the late Councillor W. Easton. The subjects are taken from the Parables the "Good Samaritan" and the "Talents." The work was executed by Mr. Baguley, of Newcastle.

Mr. John Walker, Cheltenham, has given £5,000 to endow a canonry in Gloucester Cathedral, as a memorial to the late Mr. T. Gambier Parry, the well known writer on art and amateur ecclesiastical painter.

#### SOME SWISS AND GERMAN SKETCHES.

##### TOWER AT RIVA.

**RIVA** nestles grandly under the mountains at the north-west extremity of Lake Garda. The lauben and the small harbour, with the tower, group most picturesquely, and the wonderful colouring of the lake, combined with the white, orange, and yellow sails of the



boats, gives it a special charm for artists although there is little of purely architectural interest. The walls are of rock-faced stone, the rustications having a maximum projection of 6in. to 8in. The blocks at the plinth are from 20in. to 14in. deep, and vary above from 18in. to 12in. The angles are chiselled square.

##### DORMER AT TUBINGEN, WURTEMBERG.

This picturesque bit of half-timbering is in a court-yard of an old building not far from the railway station.

##### STONE CHIMNEYPIECE, CHATEAU DE LOSSE.

The department of Dordogne is full of architectural interest, but must be explored across country, as it was by the author of this sketch, if one would really know it. The Chateau de Losse stands most picturesquely on the summit of an isolated hill far from any considerable town, and this lovely piece of work is in a disused chamber below the ground floor occupied by the family. With the exception of some nice dormer windows, however, there is not much other detail worth sketching.

W. H. SETH-SMITH.

The parish church of Shepton Mallet, which was reseated in 1837 at a cost of £2,000 with the narrow and high pews then in fashion, has just undergone another restoration at an outlay of £1,220. A new floor has been laid, and the pews have been replaced by open seats in Canadian oak, having ends covered with tracery and the linen patterns. The heating apparatus has also been replaced by new ones. Mr. John D. Sedding, of London, was the architect, and the contractors were Messrs. T. Wicks and Co., of Wells, Somerset.

On Wednesday week a new Wesleyan chapel at Chale, Isle of Wight, was opened, when there was a goodly muster of Wesleyan friends from all parts of the island. The chapel is in the Gothic style, and is built of stone, the architect being Mr. Robert Curwen, of London, and the builder Mr. Linington, of Chale. About £1,000 has been expended in the erection and fitting up of the chapel.

The town council of Bootle who twelve months since provided a supply of salt water to portions of the public baths in that town, have decided to extend the service at a cost of £3,000, in order to utilise the sea water for street watering and sewer flushing. The original scheme and present extension have been designed by the borough surveyor, Mr. W. N. Blair.



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## ILLUSTRATIONS.

THE LOGGIA OF RAPHAEL IN THE VATICAN.—SANTA MARIA DELLE GRAZIE, MILAN.—KENSINGTON COURT MANSIONS.—HOUSE AT GODDEN GREEN.—ROBINSON AND CLEAVER'S NEW PREMISES, BELFAST.—ARMADA EXHIBITION SKETCHES.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

THE LOGGIA OF RAPHAEL AT THE VATICAN, ROME.

VASARI says, of the Loggie at the Vatican, that "it is impossible either to execute or imagine a more beautiful work." Julius II. began them after the designs of Bramante, and they were completed by Raphael during the pontificate of Leo X. The Loggie form a triple portico, of which the two lower stories are supported by pilasters, and the third by columns. The only part painted by Raphael is that which faces the city on the middle tier. The two other sides in continuation were added by Gregory XIII. and his successors in order to complete the uniformity of the Court of San Damaso, which forms the entrance to the palace from the Gallery of Bernini. The Loggia of the lower story is covered with stuccoes and arabesque executed by Giovanni da Udine from the designs of Raphael, the restoration of which was completed about twenty years ago by Sig. Mantovani with ability and success. The vaults of the small domes, in which are figured the devices of Leo X., the Medicean tricoloured Prince of Wales' feather and the oxen yoke, are particularly varied and elegant for their decorations. The second story contains the celebrated frescoes, which have given the name of the "Loggia of Raphael." It is divided off into thirteen arcades, sustained by pilasters covered with stucco ornaments and arabesques by Giovanni da Udine from Raphael's designs. He is said to have derived the idea from the then recently discovered paintings beneath the Baths of Titus. Nothing can surpass the grace and elegance of these decorations—figures, flowers, animals, mythological subjects, and architectural ornaments are combined with the most delightful fancy, and though seriously injured by the troops of Charles V. and by the restorations of Sebastiano del Piombo, they are full of interest. Each coved vault of the thirteen arcades contains four subjects connected with some particular epoch of Scripture history, executed from the designs of Raphael by Giulio Romano, Pierino del Vaga, Pellegrino da Modena, Francesco Penni, and Raffaele del Colle. There are, therefore, fifty-two subjects in all, commencing with the Creation downwards through the Old and New Testament subjects. The exposure of the gallery to the weather did much to damage these paintings. The other two wings of this tier contain a series of frescoes in continuation of the Gospel history painted by Siciolante da Sermoneta, Tempesta, Lorenzo Sabbatini, &c., and Signor Mantovani has also restored these. He likewise painted the third portion of the Loggia next the Pope's apartments, and his work furnishes one of the best examples of modern pictorial decoration to be seen in Rome. Some of the sculptured doors in the Loggia date from the time of Leo X.,

and are splendid specimens of carved wood-work. The top Loggia on which the Pinacotheca opens was painted in the pontificate of Clement VII., with maps and landscapes; that on the side which overlooks the city, and from which there is a fine view, was restored under Gregory XVI., the walls being covered with maps of European countries. The illustration given to-day is from a fine photograph by Brogi, and we shall give others of the same buildings in due course. Such specimens of work cannot fail to be of value to our readers.

## STA. MARIA DELLE GRAZIE, MILAN.

GIBBS' notes on this church ("Continental Ecclesiology") are as follows:—"A large, chiefly Late Pointed church, formerly belonging to a Dominican convent. The nave, aisles, and lateral chapels are Pointed, of brick (1465, Willis); the transepts, dome, and choir of Early Renaissance, by Bramante (1492, Willis), also of brick. The refectory, now left to its own decay, contains the famous *Cenacole* or 'Last Supper' of Leonardo da Vinci." The sketches published herewith were recently made by Mr. J. Tavenor Perry.

## KENSINGTON COURT MANSIONS.

THE site of the house and gardens of Kensington Court, the property acquired by Baron Albert Grant, was some few years ago laid out as a building estate, the mansion, with all its elaborate outbuildings, being destroyed. The new roads laid out on the site were formed on the most recent models, with subways for the sewers, gas and water pipes; but much of the garden character of the property was preserved, and a large number of artistically-designed houses facing the new streets have been erected. Besides this, arrangements were made, which have since been carried into effect, by which hydraulic power and electrical light and power companies erected stations on the estate for the especial use of the tenants. The residential flats which we illustrate this week are, however, the first to have been erected on the property, and benefit by these exceptional advantages. They stand in the centre of the area, and have what, perhaps, no other flats in London possess—a large space of garden ground attached, and exclusively devoted to them, and are again surrounded on all sides by broad, open, roads, so that all fronts are of equal value. One of the special features of the plan is the arrangement of each suite of rooms so that the servants', general, bedroom, and reception portions each has its separate corridor, and each can be shut off from the other parts by a single door or curtain; the objection so often attaching to flats, of the want of privacy, is thus obviated. The entrance corridor is large, and well lighted, and so arranged as to form in itself a reception room. The servants and family w.c.'s are quite distinct, and the bath-room is away from the latter, and can be used as a dressing-room to the principal bedroom. All the rooms, corridors, &c., are directly lighted from the outer air, and all the principal rooms, including even the servants' bedrooms, have windows opening on to the streets or gardens. The whole block is divided into three separate sets of chambers, one of which is built and occupied, and the second is in course of erection. Each block is provided with one very complete hydraulic lift for passengers, and a second one as a tradesmen's lift communicating with the kitchens. The floors are so designed that the two sets of flats on each floor can be easily converted into one tenement; the plan will show very clearly the accommodation provided. Each set of flats is separated horizontally and vertically from those adjoining by party-walls or concrete floors, thus making the whole block practically fireproof. The buildings are erected of red brick and Ancaster stone, with German green slates and lead dressings. The staircases are of concrete, with walnut and pitch-pine close strings, balusters, and handrails, and it need scarcely be said all the constructional floors are of concrete and iron. An electrical supply is laid on to each set of flats, the use of which is, however, optional to the tenants. All the soil-pipes are external to the building and properly ventilated, and special care has been taken in all sanitary matters, and every room without exception has windows opening directly into the open air. The cost of the erection of the three blocks will be about £50,000. The work

is being executed from the designs and under the superintendence of Messrs. Perry and Reed, architects, 9, John-street, Adelphi.

## HOUSE AT GODDEN-GREEN, NEAR SEVENOAKS, KENT.

THE ground floor walls are of Kentish rag, with a backing of concrete and hollow bricks, Bath stone being used for the windows, &c. The upper walls are of brick, hung with plain red tiles, the roof being also tile hung. All external wood-work (except doors) is painted toned white, the rough-cast panels in the gables being the same colour, or a shade darker. The windows are either wood casements divided by sash bars, or Burt and Pott's iron casements glazed with lead lights. The work was executed quickly and well by Messrs. Geo. Punnett and Sons, of Tonbridge, Kent, the builders, Mr. Jas. Twill being the foreman. No clerk of works was employed. The architect was Mr. Fred. M. Simpson, of 9, Dean's-yard, Westminster, S.W. Our illustration is from the drawing exhibited at the Royal Academy this summer.

## MESSRS. ROBINSON AND CLEAVER'S NEW PREMISES.

THE Royal Irish Linen Warehouse, Belfast, has been just completed for Messrs. Robinson and Cleaver, of that city. It has a frontage of 128ft. to Donegal-square, and 78ft. to Donegal-place. As the ground was of a treacherous nature, 500 piles, each 40ft. in length, were driven down to the solid clay. The main building is nearly 90ft. high to the balustrade, whilst the circular tower attains a height of 150ft. Polished red, green, and black granite is profusely used throughout, in the form of pilasters, columns, and friezes. A fine, white sandstone specially quarried at Newtonards, Co. Down, has been used for the principal fronts. The roofs of the towers and their finials are of copper. Each front of the building is enriched with elaborate carving by Harry Hems, of Exeter, emblematic of the different countries of the world. A series of fifty life-sized heads of various nationalities support the pediments of the windows on first floor. Between these, and forming the caps to the pilasters, are placed finely carved busts of heroic size of the Queen, the late Prince Consort, the Prince of Wales, the Princess of Wales, and the late Emperor Frederick and the Empress of Germany. India is represented by the Maharajah of Cooh Behar, Canada by a bust of Lady Dufferin in appropriate costume, and two others represent Australia and America respectively. The piers separating balustrades over the shop are enriched by carved shields with the arms of England, the United States, Germany, London, Edinburgh, and Dublin, while on the tower are the Royal Arms, Arms of Ulster, and of Belfast. The interior of the premises is divided into eight floors. In the basement, lighted by Hayward's prismatic lights, are the boiler and engines for driving the electric-light installation. A steam-pump draws water from a well 230ft. deep for the American elevator, sanitary purposes, &c., and there are also pumps for the patent pneumatic cash tubes, &c. It also contains a large fireproof strong room, whilst the rest of the space is used for shipping orders, packing, and despatching goods, &c. The shop and first floor are connected by a polished Carrara marble staircase with massive balustrading, and circular newels surmounted by figures of white marble. These floors have been fitted as sale-rooms throughout with counters and fittings of teak and mahogany by F. Sage and Co., London. A novel feature is provided in a sumptuously fitted up ladies' parlour. On the second floor, which is reached by a staircase of Australian Jarrah wood, are the sample rooms, postal despatch, and shipping departments and offices. The third floor contains looms, weaving damasks of a fine description. The upper floors are used as workrooms for shirt and collar making, handkerchief hemming, &c. A spacious dining room has been arranged on the top floor with a kitchen, provided with gas and steam cooking apparatus. The whole structure is heated by high-pressure steam, and to insure safe exit in case of fire a stone staircase connects every floor with the street. The contract for the works has been carried out by Messrs. H. and J. Martin, the architects being Messrs. Young and Mackenzie, Belfast.



## WAYSIDE NOTES.

MR. WATERHOUSE'S presidential address at the Institute has proved to be as excellent as one expected it to be. Even if no startling announcement was made in the course of its delivery, it was yet of very great interest to his audience, by reason of its pleasant, topical nature. I was glad that the President of the Royal Institute of British Architects commenced with a reference to the greater desirability of obligatory examinations as against those of a voluntary nature; and cannot but come to the conclusion that anyone who describes the institution of an obligatory examination for the Associateship of the Institute as an immense stride in the right direction, must be an advocate for the compulsory examination of all who in the future should desire to commence practice as an architect—that, in fact, he must be at heart a Registrationist. For, in so far as concerns the Institute, the examination for Associates serves every practical purpose; the proposed examination for Fellows being a mere fanciful improvement. If, therefore, Mr. Waterhouse hints at the possibility of further steps in the direction of examinations, he must allude to some measure for compulsory registration, be it what kind soever it may.

The allusion to the Imperial Institute building was timely, and the remarks as to sites in general, and those of this country in particular, very truly made. One can believe, as Mr. Waterhouse said, that the idea of sacrificing anything in the way of space for the sake of architectural effect seems foreign to the English nature. In London we know that sites are wasted with prodigal recklessness—such good sites, that is to say, as at times present themselves for the display of masterly composition. Corner sites, especially, which, through the construction of new thoroughfares, have lately been so multiplied, are little appreciated as they should be; and although one of your correspondents recently complained that Mr. Waterhouse's own charming corner tower at the National Liberal Club was plagiarised overmuch in competition designs, if nothing original can be produced, one would be glad to see a few such designs executed in the Metropolis, instead of being compelled to witness most mortifying spectacles of opportunities for display callously neglected, or employed for an exhibition of vulgarity or the insipidly commonplace. As regards the lack of sufficient space in front of buildings, it would appear that the architect is at times placed in something of a dilemma. He has to steer between two sunken rocks in the sea of public and professional opinion. He may design his building to suit a cramped site and be abused for so doing, and he may place a fine elevation in a wholly unsuitable site and be equally abused. The late Mr. Street has been condemned for so breaking up the Strand front of the Law Courts that it might prove interesting from contrasted points of sight, and he has been abused for not designing a more massive and impressive front, the which, if he had done so, it would have been impossible to appreciate from any possible point of view.

Emimently practical were Mr. Waterhouse's remarks and suggestions as to modern streets and ancient lights. We shall all agree that the more houses there may be scheduled in connection with the formation of new thoroughfares, the better. Strolling down Shaftesbury-avenue just after it was opened for traffic, it must have occurred to many that it was a pity that the dirty, disreputable tenements bordering upon the newly-formed roadway should not have been cleared away at one and the same time. As was shown, by so doing the public would have had greater value for their money expended—a fact, however, that does not appear to have distressed the Spring-gardens folk in their palmy days.

We have now to remember the 13th of November, as on that date Mr. W. Howard Seth-Smith will deliver his presidential address at a *conversazione* to be holden at the Arts and Crafts Exhibition; and on the 27th there will be held the first of what I have no doubt will be another series of eminently business-like meetings of the Society of Architects, whereat, I presume, will be read

such of the prize essays as have been produced by those fortunate enough to have been premiated by the Council of the Society.

Several new competitions require notice. If the Carlton School Board only offers £20 and no commission for a school to cost £800, it can scarcely be called generous. Yet this offer would appear magnificent beside that of the people of Merthyr Tydfil who are desirous of altering or rebuilding the "Hope Calvinistic Methodist Church." The building committee ask for plans and estimates for the alteration of the existing building, or the erection of a new chapel on the same site. Pity they cannot decide beforehand, or get someone to decide for them, which would be the best course to take as to pulling down or altering. But the building committee of the "Hope Calvinistic Methodist Church" do not intend to go to any expense in the matter. By Taffy! no, indeed! In consideration of the professional services to be rendered, they offer the munificent sum of £10, or, mark, the superintendence of the work at a commission to be agreed upon! Hope, we are told, is a very good travelling-companion, but will not do for one's banker. So it would appear.

"M." writes to the *Athenæum* of last week re your interesting drawing of the north transept of Westminster Abbey, and says that he is sorry to hear that a new design has been prepared for the great rose window, somewhat humorously remarking that, though he can put forward no objection to the preparation of any number of designs for the aforesaid window, he would express a hope that the Dean and Chapter will prevent its being tampered with in any way. I like the moderate tone of "M.'s" communication to the *Athenæum*. He points out that, although the window may not be much like what was there in the thirteenth century, it yet fits its place and looks well, inside and out. It, moreover, he says, is fitted with contemporary stained glass, dated 1722, or some three years subsequent to the time when Sir Christopher Wren did approve of the design you illustrated. I quite agree with "M.'s" sentiment when he says that the fact that the window is in a style of its own is not a fault, but a merit. Still, many will hold contrary opinions, and, if I mistake not, some little controversy will be occasioned by your publication of the curious old drawing of the north transept of the Abbey.

How often—I am led to reflect—has an old building been aesthetically ruined from substantially the same cause as was the man who bought himself (or his wife, more probably) a new carpet! Presuming, as one reasonably may, that in the eyes of many who have authority in "restorations" the new work looks fairer than the old, it follows that at some time—or very many times—a door or window of an old church may have been restored, and made the adjoining work look disreputable. Then commences the process of ruin. The house is rendered shabby in appearance by contrast to the gaudiness of the new carpet; the old church rendered dirty and dilapidated, in the eyes of the Philistine, by the sleek masonry in the restored door; and as the new carpet leads to extensive purchases of new upholstery and furniture throughout the house, so does the "restored" window or door lead to fresh inroads upon the weather-stained and time-worn work, until, on the one hand, we have a man reduced to penury, and, on the other, a building ruined of all artistic interest and deprived of its antiquarian value. I do not wish to insinuate that the rose-window at Westminster will be tampered with on this principle; but the subject reminds me of the comparison I have made. Still, it bears some relation to the Westminster case. Before, when the transept was, like the belfry of Bruges, "old and brown"—not to say black—we did not notice any serious shortcomings in the window in question; but when the whole transept is recased, and it becomes, perhaps, a touch-and-go whether the rose-window shall stay or remain, there may be temptations to do away with it and render all sleek and clean. The Abbey, we all know, is in good hands; but seeing that it is our own beloved edifice that is affected, we Londoners feel more concern than

usual in such matters, although under the superintendence of Mr. Pearson. I feel sure we may confidently rely upon everything being done that should be, and until it is definitely shown that the rose-window should be left intact, we need trouble ourselves little about it.

In your leader last week you spoke of the lamentable lack of knowledge of draughtsmanship amongst artisans and craftsmen. It is a very justifiable complaint, as most persons know. How often can one call to mind cases where a workman, having expressed an opinion on some matter of detail, is asked to explain graphically his idea, declares that he is "no hand at drawing," and appears as bashful of his attempts to delineate an object as is the inexperienced and unaccustomed singer at the sound of his own voice. To ourselves this ignorance and inability to describe a simple object with a few strokes of the pencil seems astonishing; but doubtless the lack of practical knowledge displayed by many architects must be equally astounding to the workman. One must admit that the fault exists on both sides, and both parties should endeavour to improve themselves. The ignorance of both is reprehensible—perhaps that of the architect the more so, as he has abundant opportunities of acquiring the deficient knowledge, whereas the craftsman has none. In other words, the architect ought to know better.

GOTH.

## ARCHITECTURAL ASSOCIATION.

THE second ordinary meeting for the present session was held on Friday evening, the President, Mr. Herbert D. Appleton, in the chair. The following 66 new members were elected:—Messrs. J. A. Waddington, E. O. Warne, S. P. Davis, J. B. Tansley, E. C. Finch, W. L. T. Brown, A. J. Hardwick, A. Spiers, A. J. Roddis, F. Rhoades, W. Langbein, A. Cox, C. Roche, A. G. Salmon, A. E. Watson, H. P. Adams, A. P. Crabb, R. N. Sinclair, T. H. Bishop, S. Howard, G. P. Armstrong, M. Price, A. Hogwood, E. R. Cook, P. S. Worthington, G. E. Strafford, H. E. Kirby, J. E. Watt, W. W. S. Smith, J. Hunt, J. H. Richardson, H. L. Goddard, H. F. Mence, G. Kenyon, D. B. Niven, A. H. Crawford, A. Wollheim, J. H. S. Fane, A. A. Abrahams, E. C. Frere, J. A. Pywell, F. E. Williams, F. J. Potter, J. Murray, J. Stewart, J. R. Stark, F. Cook, J. W. Wyles, A. Whitcombe, E. A. Whipham, W. C. Ashworth, H. E. Elkins, W. E. Holland, G. G. Lynes, J. W. Hall, G. P. Pratt, R. W. Gibbon, H. Stony, F. J. Slater, C. G. D. Innes, E. J. Wallis, H. G. Leslie, H. C. Maw, C. Evans, W. A. Hughes, and W. Palotta.

ELIZABETH V. VICTORIA.

A paper on this subject was read by Mr. J. Alfred Gotch, F.R.I.B.A., past-president, of Kettering. The lecturer remarked that during recent years Gothic had been replaced as the style in which domestic architecture should be executed by work based on that carried out during the reigns of Elizabeth and James. For ecclesiastical architecture Gothic was still preferred; but it was found that the Domestic architecture of Elizabeth and James afforded many clues and hints towards solving the problems of to-day. There was also an historical reason for the alteration of taste we had witnessed during the past twenty years. The 16th century marked sharply and decisively a complete change in men's habits of thought. With the Cecils and the Hattons, and the innumerable builders of mansions under Elizabeth, we had much in common; their ways were, many of them, our ways, and their thoughts our thoughts. But we had little or nothing in common with the builders and sculptors who erected and adorned our abbeys, churches, and cathedrals. Men of business cared for none of the things that invested those works with interest; but they did care for comfortable homes, for handsome houses, for labour-saving appliances, for all the conveniences which modern progress afforded, and from their architects they expected, first of all, these material advantages. It was not surprising, therefore, that the taste for Gothic houses was short-lived, and that attention was diverted, with better prospect of success, to the great house-building epoch of Elizabeth. That period and the one in which we now lived



were unrivalled for the amount of building which marked them. There was in that reign hardly a squire who did not either rebuild his house or materially modify it, while most of the nobles and nearly all the high functionaries of the Court erected mansions which to this day were, such as remained to us, models of stately design and magnificent taste. But though Elizabeth's days were more suitable sources of inspiration to us than the earlier times of unalloyed Gothic, Mr. Gutch would not advocate blind copyism for the architect, nor recommend a client to build himself a house strictly after the fashion of those built—as Evelyn phrased it of Kirby in the middle of the 17th century—*à la moderne*. Not at all. Mere copyism was the resource of the feeble; but there was every reason why we should profit by the ideas, the successes, and more especially the failures of those who had gone before us. And for that reason it seemed to him that an examination of the work of Elizabeth's time in the light of these days of Victoria would not be out of place. It was the same wherever we went. If we found an Elizabethan house occupied now, either some radical alteration had been made, to the detriment of the architectural harmony, or else the inhabitants were willing to put up with manifold inconveniences rather than disturb the ancient order of things. One of the most obvious drawbacks of the Elizabethan plan was the number of thoroughfare rooms. Burghley House had been helped by building a corridor round the courtyard. At Canon's Ashby, for want of some such addition, one had, from a considerable number of bedrooms, the choice of two ways to get to the breakfast-room. One was through the drawing-room, and down the main staircase; the other was down a subsidiary staircase and across the open courtyard. At Kirby the same difficulty was present, and before that house could be inhabited again that difficulty would have to be surmounted. The fact was these large houses were built for entertaining guests rather than as homes for their owners. The long rows of small rooms arranged round the courtyard were separate groups of apartments, self-contained, and designed to accommodate visitors and their servants, in the same way that each undergraduate had his separate establishment at college. In the present day our habits were different. We did not entertain on the same sumptuous scale; a separate suite of rooms for every guest was not expected, and people liked to get to their rooms under cover. We found in these days that it tended to the easier and better work of the house to get all the bedrooms upstairs, and the reception rooms on the ground floor. One of the governing features of an Elizabethan house we entirely omitted from our designs—the long gallery. We looked for large and lofty rooms now, because in themselves they were handsome and imposing, and not because they were picturesque backgrounds to our noble selves. We sought for comfort, not pageantry. The smaller Elizabethan houses were much more compact, and were tolerably convenient. But it was obvious even in them that expense was but little studied. If there was less money to spend, the house was made smaller, but no pains were taken to contrive economical plans. All those ancient buildings must have caved out at a terrible figure. Everybody concerned agreed that one of the first things to be secured was a handsome building. The idea of getting the house comfortable inside, and leaving the outside to take care of itself, with strict orders to spend no money on show—a not infrequent instruction to modern architects—did not seem to have occurred to clients in those days. They were quite content to let the architect have his way, and he went on the principle of making his clients adapt their wants to his architecture, rather than that of adapting his architecture to their wants. The method of the Elizabethan architect was simple enough. He ascertained approximately the accommodation required by his client; he found that he wanted a certain type of house, and away he went. The plan, perhaps, worked out so that there was a room or two more than the number asked for. A very simple matter; he just labelled them "waste," and the client had to pay for their erection; and the client's grandchildren, probably, paid for their pulling down. Symmetry was another great solvent of those days:

it simplified matters wonderfully. There was no need to adjust the sizes of the rooms to their various purposes, or to study the best positions for the windows and fireplaces. A start was made with the hall and the adjacent rooms; the position of the kitchen in relation to these was usually carefully considered, provision was made for the longest possible gallery, and the rest was left to take care of itself. If it did not happen to work out quite happily for the best arrangement of some of the rooms, if the doors and windows quarrelled with the fireplace, or if the larder found itself possessed of a great bay window, nobody minded, for symmetry demanded it, and this excuse satisfied everybody. In the present day it was otherwise. Not only had we to be very careful how we planned our buildings,—so that not only our client and his wife were satisfied, but also his ox and his ass, and everything that is his,—but as every foot of material was reckoned up beforehand, we had to be particular not to put in too many of them. Then, again, the great question of sanitation had not yet arisen. To-day we were slaves of the soil-pipe. That unsightly talisman has to be hidden as far as may be; and in the effort to hide it, we made the whole house revolve round the small apartment which it safeguarded. Not so the architect of Elizabeth's days. He was lavish in his supply of such apartments. Generally each suite of rooms had one. Further, the particular care bestowed upon the position of the kitchen was exclusive of the consideration whether the servants overlooked the precincts especially devoted to the family. This was a factor which played no part in designing a house in Elizabeth's days. To look at it from the outside, the house appeared equally imposing from all points of view. Modern views demanded that the servants' department should be quite separate from the family's; and, as money must be saved somewhere, it had better be in the servants' offices, which need not be so expensively finished outside as the rest of the house. At once, therefore, we had a back to the house; a large part of the building which had to be subordinated to the rest, which must be differently treated. This necessity alone was a factor which widely divided our ways from those of Elizabeth's time. So, too, in the treatment of the elevation. In the old days they thought nothing of putting in numberless sham windows, chimneys were made to resemble coupled columns, and great heraldic creatures clambered about the stonework. But who was responsible for these buildings? That was a question not yet satisfactorily settled. That there was anything like the autocratic and all-accomplished architect of our times the lecturer did not believe, who to-day designed his client a sideboard, to-morrow arranged his drains, and next week commenced a stained-glass window to his memory. Things were much simpler in those days, and the various branches of the business of housebuilding were under the special care of separate men who might—indeed, must—have been amenable to a central authority, but who certainly did not look to him for every morsel of design and instruction. The correspondence relating to the erection of Cobham Hall seemed to show that the clerk of the works—one R. Williams—bargained separately with the various masters of trades. The letters relating to the building of Hatfield gave one the same impression. The only agents who appeared were the clerk of the works and the foremen, or the surveyors who were sent down to ascertain in what state the buildings were, and why the cost so much exceeded the estimate. There was no architect mentioned; the correspondence was carried on between the clerk of the works and the building owner, from whom instructions issued directly. Sometimes, however, a surveyor was employed to superintend, as was the case at Holdenby. Most of the large houses of Elizabeth's time were thus superintended by a surveyor—or architect, as we should now call him—of whom the best known was John Thorpe. But his functions were far different from those that we have to fulfil. The hundreds of drawings that now go to the erection of any considerable building were wholly unknown. Plans and elevations were supplied; but, so far as could be gathered, the details were to be arranged on the spot. The existence of the quantity surveyor was a marvellous tribute to

the ingenuity of the human mind; and he was also one of the most noticeable barriers that divided the times of Elizabeth from those of Victoria. But it was not for us to deplore the fact that times had changed. We had to recognise that they had changed, and that we were expected to solve our own problems in our own way, instead of vainly seeking problems that might be solved by the old methods. The difficulties of Elizabeth's days were not exactly those of ours. But we could recognise how well those difficulties were met, and if we were content to study the two things together, the questions and the answers, and to refrain from playing at cross-questions and crooked answers, we should find great help in answering our own questions in our turn.

#### INSTITUTE OF PAINTERS IN OIL COLOURS.

THE present exhibition in Piccadilly is scarcely up to the standard of the last. J. J. Shannon sends three portraits of a quality which mark him out as a master. The pleasing face and treatment of dress in the portrait of Mrs. White (10)—a face full of brightness and health; the idealised portrait "Rose Pink"—a young lady, seated in pink walking attire, at the end of the gallery; and the poetically treated portrait of Miss Nicholls (431), a fair maiden with charming eyes and features, are examples of Mr. Shannon's power of idealisation, which imparts such interest to his sitters; almost Reynolds-like is the last named in its grace and handling. S. Melton Fisher sends a portrait—Miss Alba Stefani—in which also the light background is adopted as a better relief to the pallid face of the young lady. Horace Fisher's "Pigeons' Breakfast" (1); the reflection of light on the moor in "Daylight on its Last Purple Cloud," by Frank Walton (14); the delicate colour and handling in Miss Ada Bell's jar of chrysanthemums (19), "All that's Bright must Fade," &c.; J. Fraser's "Lobster Catchers" (32); George Wetherbee's "Autumn" (43), admirable in the poetry and feeling expressed in the wan face of the young woman, with her bundle of sticks, and the drear landscape; and Arthur Stock's "Fifth of November" (40) are among the few pictures of merit. Plaintive landscape effects are given us also by Will Anderson (60), Fredk. S. Richardson (63), and A. Heloké (91), soft and subdued. Incident finds its depicitors. G. G. Kilburne's "Her First Appearance," a young girl standing to give a song (78), has all the qualities, refined drawing and expression which this master of society *genre* can give; the diffident face of the girl and the old pianist's countenance are both painted with feeling. A. H. Burr in his "Breakfast for One" (90), a little girl feeding a dog on a chair, is nice in grouping and tone. T. B. Kennington sends a lady's portrait (98), which shows some strong and forcible painting; we must take, also, notice of Joseph Knight's "Old Road" (111), Tom M. Hemy's "Old Quay, Sunderland" (103); Solomon J. Solomon's seated portrait of Mrs. Ernest Lowy (116), taken at a tea-table; C. E. Johnson's pleasing landscape "Ripe for the Sickle" (120). H. Fantin Latour, a rising artist in the higher class of composition, exhibits unquestionable imagination and poetical treatment in his "Scene Finale der Rheingold" (121), and his "Siegfried and the Rhine Maidens" (175), both of which display power as well as a poetical interpretation of incidents in the German legendary story of the Niebelungen-Lied.

In the same class of painting George Marks sends "Vanishing Dream," in which the figures and drapery are graceful and well modelled (131). John R. Reid contributes his usual fisher-life scenes; the group of fisherfolk at a quay, under the glow of a warm sunset light, recalls his picture of "Smugglers"—the poetic feeling is strong and transcends the commonplace—the picture is indeed a poem in colour. In his pleasant, humorous mood, W. Dendy Sadler paints two friars indulging in a quiet joke. "Between Whiles" (159) is characterised by the same keen relish of the humorous side of our nature that so distinguishes this clever satirist of the foibles of monastic life. It is interesting to note, too, that Mr. Sadler has not entirely given up his descriptive powers to friars, for at the last



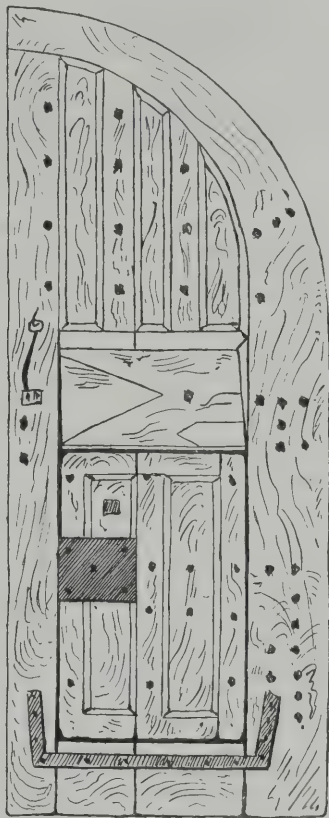
Academy, and again here, he has turned his critical pencil to the characterisation of another class—the connoisseur of wines. "Corked" is a fresh version of "Old Crusted Port"—(223) shows, seated at a small loo-table outside a country house, two elderly gentlemen in the style of the early part of the present century, enjoying some old port. One of them with white hat and figured vest is looking anxiously to his companion for an opinion, while the latter is holding a glass to his nose. The costume and accessories are painted with much refinement and skill. Geo. Morton's study of a female father (181) is graceful and delicate in tone. In the central gallery one looks for the work of the president. This year, Sir James D.inton exhibits a study of portraiture—"Daughter of E. Meredith Crosse, Esq." (250), a work possessing the charms of drawing and technique that we usually find in Sir James; studies, though, not so interesting as last year's picture; the strong red in the dress destroys the balance of tone. Edward H. Fahey's sketches (98, 200) are truthful. As a painter of incident, Haynes Williams has done scarcely anything more pleasing than "A Decided Answer" (205); the graceful drawing of the young ladies and the elegant 18th-century attire and surroundings are tasteful, if the handling is somewhat mannered. Miss Minna Tayler's "Horned Poppies" is a delicate study of colour. A pretty study of a girl on rocks is painted by Bourdillon (237). Stanhope A. Forbes is exceedingly happy in the grouping and expression in "The Fisherman's Reading Room," a well subdued interior. George Chester follows the style of Constable in the "Old Rickyard," which hangs conspicuously in the centre, over the president's picture. Claude Hayes sends a vigorous piece of painting, "After the Floods" (261); and the atmosphere, reflected light, and every tone of "Old Fish Weir, Dieppe," by W. Norton (264), show close study of seaside effects. Frank Dadd, whose facetious pencil so well known, has "Awaiting Sentence," a study by whose propensity for stealing apples has brought him as a suppliant before an elderly gentleman and his daughter, who are rather more inclined to frighten than punish. J. Watson Nicol's "Forbidden Fruit" is clever in a conception—the boy kneeling behind the bush, shading the eyes of the old woman is an adept. In other pictures, we must notice Herman G. Berkomer's portrait sketch (277), a gentleman with grey beard painted against a casement window; F. D. Millet's delicately-painted subject, "A Tender Chord" (299), a pretty girl with guitar by a window, in a low key of colour; W. H. Pike's "Sunday Reading, Chioggia, Venice" (295); Miss Miriam Davis's "Hiding." J. C. Dollman's facetious picture, "Vols. I., II., and III." (357), is clever as a study of character—three young ladies, each with a volume, exhibiting different degrees of interest, while their poor canine companions are impatiently waiting. "Stern Duty," by Delapoe "Downing" (362); and under it a small study by L. Alma Tadema, R.A. (367), hung in the centre of gallery, are all well worth attention. "Roses" (364), a long panel-like treatment by Miss Katharine L. Beard, is tastefully painted, after which we can admire the graceful, idyllic figure and meadow by Leend King, "May and Marguerite." Seymour Lucas, A.R.A., contributes a small study entitled "Original Sketch for St. Paul's" (404), a version of his picture in the last Academy, in colour and tone preferable to his larger work. We also notice pictures by Frank Dillon (383) and Thwaite Irving (413). Few remarkable pictures are hung in the East Gallery. W. L. Wyllie paints, with his usual knowledge and skill of river craft, "The Highway of Nations" (430); John Burr sends a clever study of an old woman's face (474), near which hangs a fine seascape by Edwin Hayes, R.H.A. (477), "Fishing Fleet off Granton Harbour," full of freshness, transparent colour, and atmosphere. The interesting picture of Seville, by John Varley; James Webb's fine landscape, "Sunshine and Showers" (521), an open moor with windmill, rich in tone; together with Keeley Halswelle's grand autumn landscape (531), a woody dingle and river, rich in tints of autumn brown, redeem much that is mediocre. Powerful in its pathos and sombre colour is Arthur Hacker's "The Children's Prayer" (537), while Arthur East sends a fine "Moon-rise." Only one landscape

is sent by E. M. Wimperis, whose work is always fresh and truthful. His undulating "Sussex Downs" (598) has fine qualities, the light and atmosphere well rendered. Edwin Hargitt's view of "Arundel" (619) is painted with breadth. Henry J. Stock's large picture "Sin Piercing the Heart of Love," is somewhat crude in colour: otherwise there is much skill and mystical power in the allegory. Ernest Parton, B. A. Bateman, Jas. Hardy, John O'Connor, R. Carrick, and B. M. Latham are contributors of meritorious works.

#### SHIRBURNE CASTLE, OXFORDSHIRE.

By the Rev. FREDERICK GEORGE LEE,  
D.D., F.S.A.

SHIRBURNE CASTLE, which stands about a mile east from Watlington, in Oxfordshire, in great probability was originally a building in the Norman style of architecture\*, but, from time to time, has been so altered and added to—except in its general ground plan and its four corner-towers, circular in shape—that the existing architectural features of it are somewhat vague and indefinite. Its windows, though possibly occupying, in the



main, their ancient position, are comparatively modern; and though the general appearance of the place—surrounded by wood and water and gardens—is exceedingly picturesque and striking, the loss of certain of the castle's more severe ancient characteristics is a loss indeed.

It rises from the form of a parallelogram, surrounded up to its very massive walls by a moat in some places 16ft. deep, the castle itself being entered by three drawbridges still used, drawn up every night†. The area within the four sides of the main building has been covered over, with additions, for the sake of

\* Though Warren de Lisle obtained from the king (61 of Edward III.) a special licence to crenellate his mansion house, yet in all probability the remains of a previous castle existed, for, as Brunetto Latini wrote in the 13th century, this castle was built by the Earl of Tankerville, one of the followers of the fortunes of William the Bastard, Duke of Normandy, who invaded England, and slew Harold in a battle which determined the fate of the kingdom. It is now in possession of a descendant of the said Earl—Symonds MSS. Vol. I. p. 124, in the possession of Thomas Davenport, Esq., of Oxford.

† There are two picturesque and well-engraved views in Skelton's "Oxfordshire," and a photograph of the exterior of this castle in a small and interesting handbook, "Scattered Notices of Shirburne Castle, Oxfordshire," by Mary Frances, Countess of Macclesfield, London: 1887.

comfort and convenience, while on both the north and south sides substantial additions have from time to time been made. The chief entrance (shown in the accompanying sketch) is on the castle's western side, and the drawbridge here is very effective and curious. The ancient stone doorway, of Third Pointed style, is bold and massive, the oak doors themselves being of unusual solidity. A sketch of the right-hand side of the actual door is given. The old wooden portcullis existed until recently, and was still capable of being drawn up and down in its stone grooves; but has at length given way to complete decay. The drawbridge itself, though of no great antiquity, was no doubt constructed after an older type. Within, the entrance hall, leading to the armoury, is groined in stone, with massive ribs, vigorous mouldings, and good general proportions. But here too the finger of Change has been felt; for, in its later and not unreasonable adaptation to the needs and conveniences of modern life, some old features have been obviously obliterated or lost. It remains, however, a building of very remarkable interest, notwithstanding such adaptations—those of varying periods in the past and of various tastes. Some bedrooms and dressing-rooms were added to the castle in the 18th century, and the present drawing-room on the north side in 1830. In 1873 the warder's chamber in the north-west tower was made a smoking room.

Internally, the castle is at once handsome, effective, and stately. The drawing-room and its ante-room contain several pictures and miniatures of great value and interest. There are also the ancient entrance hall, armoury, staircase hall, study, smoking-room, dining room, a passage (in which a full-length portrait of Lord Chancellor Parker hangs), billiard-room, picture galleries, north library and south library, together with the ordinary kitchens and offices of a nobleman's mansion.

The library of books, now divided into two portions, north and south, was formed by the first Lord Macclesfield, large additions having been made by his immediate successor, who was a great mathematician and a celebrated astronomer. Many of the books are very rare and valuable. It contains one set of original MSS. in folio, "Chamberlain Evidences," in about twelve volumes, relating to the descent of the castle and its lands, and full of detailed notices of the Chamberlain family—an ancient and respected Oxfordshire race. The library consists of about 14,000 volumes, and is no doubt one of the most valuable in private hands throughout the whole of the county.\* Thomas, sixth Earl of Macclesfield, finding the books unsystematically arranged, and needing reparation and careful restoration, had the whole examined, rearranged, and duly catalogued. This, which occupied a man four years, took place 25 years ago. Its MSS. catalogue now consists of four large folio volumes—"Catalogue of Subjects," two volumes "Index of Authors," together with two smaller volumes "Shelf Catalogue." The library contains an excellent collection of books relating to Oxfordshire—archaeological, antiquarian, historical, social, and general—many law books, and many standard works on mathematics and astronomy.

The descent of the castle and manor from the time of the Conqueror may thus be tersely recorded:—

In the reign of King Stephen, Shirburne Castle was held by Brian Fitz-Count, Lord of Wallingford. In 1231 Henry le Ties, by grant of Richard, Earl of Cornwall, held Shirburne, and it duly passed to his son and heir, Henry le Ties, junior, A.D. 1307. In 1321 this owner of it suffered death at London for having taken part in a rebellious movement with Thomas, Earl of Lancaster, so that Shirburne passed to his married sister Alice (le Ties), wife of Warren de Lisle, of an ancient race in the Isle of Wight. He, too, was hung for a similar offence. This punishment occurred at York, when his son, Gerard de Lisle, was exactly 23 years of age, his widow, the afore-mentioned Alice, surviving. She obtained a pardon and other grants from Edward III. Her son Gerard eventually married Elizabeth, widow of

\* John Nicholl, the antiquary, stated that the Shirburne Castle Library was sold in 1831; but this seems to have been an error, as the older portion, with the ancient book-plates, remains duly and safely preserved.





SHIRBURNE CASTLE, OXFORDSHIRE.

Edmund Saint John, and dying in the 34th year of Edward III., he left a son, Warrene—named after his grandfather—who secured a license to fortify and crenellate his mansion at Shirburne (Patent Roll, 51 Edward III., membrane No. 32). This licence was dated from Sheen.

This Warrene de Lisle married Margaret Pipard, of an Oxfordshire family of great repute and position, and at his death (28th June, 6th Richard II.) left Margaret, his daughter, wife of Thomas Lord Berkeley.

The only child, Elizabeth—daughter of Thomas, Lord Berkeley, and Elizabeth—became wife of Richard Beauchamp, Earl of Warwick, and inherited Shirburne. In the fifth year of Henry VI. the castle and manor passed to the Oxfordshire family of Quartermaine, of which family a pedigree may be found in my "History of the Prebendal Church of Thame"; and then to one Richard Quartermaine Fowler, of Rycote, Oxon (see John Leland's "Itinerary," Vol. II. p. 9, first printed in 1542). Soon afterwards, by exchange in Henry VIII.'s reign, it went to the family of Chamberlain, of Woodstock and Ardington, in Oxfordshire.

From the family of Chamberlain, one of whom, Mary, the daughter and heiress of John, it passed to the family of Gage, one member of which was first made a baronet, and another a viscount. In 1716 it was sold by Sir Joseph Gage to Lord Parker, afterwards 1st Earl of Macclesfield and Lord High Chancellor.\*

For the ancestry of this noble family may be consulted Jacob's "Peerage," Vol. II. p. 95; "The History of Leek in Staffordshire," by John Sleight, pp. 23 and 108; Burke's "Peerage," and John Foster's "Peerage." A pedigree amongst the peer's volumes, is on record at the College of Arms; while Foster's "Alumni Oxonienses" contains many personal facts and accurate dates concerning members of the family in more recent times. A brief account of the church and castle of Shirburne is also given in "The Ecclesiastical Antiquities of Oxon," published by Parker, of Oxford; and in Mr. T. M. Davenport's volume, "Oxfordshire: Lords Lieutenant, High Sheriffs, and Members of Parliament" (Oxford: 1888, 2nd ed. p. 89, a note of the Parker's occurs.

It is to be hoped that ere long some general history of the county of Oxford may be taken in hand. Even if the University were in this omitted, the archaeological stores existing and

available would go far to make up a series of large volumes: for the churches and country houses are of singular interest. Other counties have in archaeological works what Oxfordshire so greatly needs.

There are some very fine pictures preserved in Shirburne Castle,\* that of Erasmus, by Holbein, being one of the most remarkable; that of Archbishop Laud, by Vandyke, being of scarcely less interest.

In the drawing-room, in addition to the above, are the following:—Queen Katherine Parr, Zuccheri; Titian and Aretino, painter unknown; Head of a Gentleman, Sir Antonio More; Head of a Lady, Sir Antonio More; Lord Keeper Coventry, Van Somer; Lord Bacon, Van Somer; Villiers, Duke of Buckingham, Jameson; Ferdinand of Austria, Van Thulden; Portrait of a Burgher, Frank Hals; Head of an Old Man, Lievens; Earl of Carnarvon, Mytens.

*Ante-Drawing Room.*—A Man in Armour; Portrait of a Lady, D. Haringh, 1671; Jonker Hendric Montens, b. 1463, d. 1548; Joffrouwe Johana Rooiere, b. 1484, d. 1530; Mary Frances, wife of George, 4th Earl of Macclesfield, Romney. Frame containing nine miniatures:—1st Earl, 1st Countess, 1st Countess, 2nd Earl, by Gervas Spencer; 3rd Earl, 4th Earl (when Viscount Parker), by John Smart; 2nd Earl, by Zincke; Rev. W. Jones, signed P.C.; Oliver Cromwell.

*Dining Room.*—Six pictures of horses, the property of General the Hon. George Lane Parker, Stubbs; full length of Thomas, Sixth Earl, in hunting dress, with four hounds (Sprightly, Rally, Rachel, and Lucy), presented by the members of the South Oxfordshire Hunt, Hon. H. Graves, 1873.

*Study.*—Maria, Countess of Haddington, daughter of George, Fourth Earl, Hoppner.

*Staircase Hall.*—Full length of Eliza (Wolstenholme), wife of Thomas, Fifth Earl, Masquerier.

*Passage.*—Thomas, First Earl, Lord Chancellor, full length, Godfrey Kneller.

*Billiard Room.*—The same (kitcat), Godfrey Kneller.

*Crimson Bed Room.*—The same, as Lord Chief Justice, Godfrey Kneller.

*Picture Gallery.*—The same, Thomas Parker, 1703, Closterman.

*Billiard Room.*—Mary Lane, wife of George, Second Earl, Godfrey Kneller; portrait of a lady, Godfrey Kneller.

*North Library.*—George, Second Earl, Hogarth; William Jones, Esq., Hogarth; Sir

Isaac Newton, 1719, Godfrey Kneller; one of the Parker family in Court dress; Dr. Edmund Hallez, Ramsay; Italian Portrait, Sebastian Conca; William, Earl of Pembroke (miniature) Polemberg; Head of Charles I.; Head of a Doge.

*Staircase.*—A Boar Hunt, Snyders; A Wolf Hunt, Snyders.

*Picture Gallery.*—Two Ponies (Romulus and Remus) and a Terrier (Nettle), Ferneley, 1814; Thomas, Third Earl, when Viscount Parker Ramsay; Mary, his wife, Ramsay; Lieut. General the Hon. George Lane Parker, Hudson; Mary (Heathcote), Wife of Third Earl, Masquerier; Sir Thomas Clarke, Master of the Rolls; Thomas, Sixth Earl, when Viscount Parker, Eddis; Mary Francis (Grosvenor), his Wife, Eddis; Sea-Piece, initials A.B.S.; Portrait of young man, Mrs. Beale; Four Heads supposed Mrs. Beale.

*South Library.*—George Graham, Hudson; Dr. James Bradley, Ramsay.

In laying down my pen, I acknowledge the kindness of the Earl and Countess of Macclesfield in permitting me to see the castle and its contents, and in supplying me with much information of great interest regarding the same embodied in this paper.

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XVIII.

By HENRY LOVEGROVE, F.S.I., Surveyor.

I HOPE to finish the dimensions this week to enable me to review the whole next week, and call attention to one or two errors which are unavoidable in printing such a mass of figures. I shall try to publish the remainder of the abstracts so as to leave nothing but the continuation of the specification and the bills of quantities.

### GLAZED BRICKS.

Extra to glazed brick facing, set and pointed in cement to form dado of approved tints and manufacture, the lower part to a height of 9 in., forming skirting of different tint to the upper.

	24	0	Deduct.
1,268	10	48	9
716	10	49	0
992	10	78	9
172	9	70	6
120	6	92	0
61	0	31	8
210	0	40	6
2	3	411	2
373	6		
3,942	6		
411	2		
3,531	4		

\* Lord Campbell, in his biography of this Lord Chancellor Parker, puts the following on record: "The decisions of Lord Macclesfield in the Court of Chancery have ever since commanded an authority second only to that of the most illustrious judges who have filled the seat of Equity—of a Hardwicke or an Eldon."

\* I am indebted to Lady Macclesfield's book already referred to for the list of pictures here produced.



Era to relieving arch in do.

6 5 Do. to flat arch do.

17 8
4 9
2 4
24 9
1. Fair cutting in facings.
9 0 Do. circular.
21 0
23 0
57 0
6 0
1 6
3 0
120 6
0 Mi.
0 2 Extra to circular angles to rooms 1ft. 2in. girt.
69 0 Extra to moulded capping to dado
69 0 3in. high, and projection set in
69 0 cement and pointed.
67 0 110 4 Deduct.
274 0 124 8 28 0 Mi.
172 8 45 0 2 Std. Ends.
20 6 6 0 23 28 M. and R.
4 0 16 0 24 4 do.
36 0 5 6 4 8 16
468 2 18 0 4 4
118 6 118 6 4 16
349 8 8 2
8 62
82

Era to rounded extl. angle to chimney brst., &amp;c.

0 Mi.
0 2 Extra to circular angles to rooms 1ft. 2in. girt.
69 0 Extra to moulded capping to dado
69 0 3in. high, and projection set in
69 0 cement and pointed.
67 0 110 4 Deduct.
274 0 124 8 28 0 Mi.
172 8 45 0 2 Std. Ends.
20 6 6 0 23 28 M. and R.
4 0 16 0 24 4 do.
36 0 5 6 4 8 16
468 2 18 0 4 4
118 6 118 6 4 16
349 8 8 2
8 62
82

F f do. to angles 14in. girt.

6 M. g. facings to ends of steps.

2 40

6

6

10

## TERRA-COTTA.

Ce terra-cotta and setting in cement.

125 7 Run. Labour gro. and bng. in
105 5 lead flashings.
249 10
46 7 64 0
91 9 15 0
217 0 79 0
46 10
25 3
30 5
16 3
108 7
1063 6
2 3
1061 3

Ejecting moulded keys 9in. by 2ft. 1in.

1 Chimney pots for three flues as sketch, 5ft. by 2ft. 3in.

by 2ft. 6in.

2 3 Do. w. pediment on one side as sketch.

1

## MASON.

k stone.

2 self-faced cover stone coped to widths.

2 0 9in. by 3in. rubbed, threshold, jointed all round.

12 0 14in. by 3in. do.

22 0 15 by 8 rubbed, step bedded on conc.

including all joints in cement.

92 0 F.E.

4

9 y 7 do. brick jointed.

8 6 Perfs. through do. for R.W.P.

2

3 td. templates 14in. by 12in. under ends of sash-bars.

4 Do. 12in. by 12in. set in cement.

4

## CHIMNEYPIECES, &amp;C.

3 stone shelf 12in. by 3in. cut and pinned into wall

with moulded front edge and returns to form chimney-

piece, including cut glazed brick facing and m.g.

Do. brackets under ends of do. 4in. by 9in. by 6in.

moulded and carved on front cut and pinned into

wall, including all cutting to glazed brick facing

and m.g.

12 Sup. glazed tile hearth bedded and jointed in

cement.

98 1 Glazed stoneware fenders to hearths

with 2ft. 6in. opening for fireplace and

fixing.

11

## TILER.

Et Broseley tiling as described.

4322 6 Deduct.

200 0 70 0

2392 10 121 2

6915 4 191 2

191 2

6794 2

Cutting and waste on tiling abutting against walls.

2 0 Double co. of tiles in cement at eaves.

1 6 154 0 Red ridge tile as described bedded in

10 0 130 6 cement.

1 0 284 6 217 0 Termination of do. with two

hips.

15 0 8

I tiles.

0 Valley do.

0 178 0 Cement ptg. to verge and fillet.

80 0

51 0

131 0

Local tiling.

0

Run cutting and waste to do.

20 0 D. course of tiles in cement at eaves.

48 0 20 0

68 0

Ornamental vertical tiling and battg. or bdg.

45 0 Run R. C. and W. on do.

37 4 D. Co. in cement.

20 0

## COPING TO GABLES.

4 1 0 Terracotta in moulded pediments  
1 6 set in cement and pointed in  
1 0 all dowels and mortises and  
iron cramps.

16 10

1 6

8 9 15 0 Add.

1 0

4 1 0 12 0 Add.

2 8

4 1 6 12 0 Add.

2 9

4 2 9 11 4

4 4 0

8 1 6 20 0 Add swelled frieze.

8 1 0

4 1 0 12 0 Add moulding under do.

4 2 3

8 1 0 3 5 Add band

8 7 9

1 6

24 46 6 Terracotta moulded coping set  
in cement and pointed.

1 3

8 1 6 Add in bonders with moulded  
coping.

1 3

56 3

8 3 0

1 6

8 1 6 54 0 Add knees.

8 1 4

1 0

8 10 8 0 Add summer stoves.

8 10

8 1 2 5 10

8 1 2

8 9 10 6

8 1 6

4 2 4 21 0 Corbels.

4 7 0

4 7 0 Do. in moulded string.

4 4 1/2

4 9 7 11 Do. plain band.

4 8 5

4 9 9 3 Terracotta plain band.

4 16 0

43 4 1/2 18 0 Add.

4 9

10 2 And for bonders.

2 11

2 11 Terra cotta in mld. pediment to  
gable of w.c. in front, set in  
cement, &c., as before.

2 1 6

2 3 5 Add in moulded coping.

2 9

2 3 1

1 2 2 4 1 0 Do. in plain tympanum.

2 3

2 3 2 6 Terracotta moulding above  
swelled frieze.

2 6

3 4 Do. in swelled frieze.

2 10 Do. in moulding under do.

3 7 Do. in moulded coping below  
pediment.

2 0 10 Do. in panel,

4 0 Do. in coping.

2 11 Do. in panel.

5 3 Do. in moulding coping.

6 3 Add do.

8 4 Do panel.

3 3 Do., do.

ft. in.

1 0

1 3

6 1 3

1 11

1 3

6 2 3

1 6

1 7

6 2 5 Do. in do.

1 9

2 0

1 5

3 4

1 6

3 9

11

1 0

1 3

9

1 0

1 0

9

1 1

1 3

2 6

2 0

1 4

1 2

8

1 2

11

1 8

4 1/2

1 6

6

4 1/2

9

3 5

1 2

1 6

6 0

4 9

11

2 1

17 6 Add.

4 0

1 6

1 2

10 0

1 6

1 2

17 6 Add.

3 14 0

1 6

73 6

Terracotta moulded cornice to  
chimneys.

1 2

17 6 Add.

4 0

1 11

8 11

Add extra to moulding to pedi-

ment.

2 Terracotta chimney-pots for

three flues 5ft. by 2ft. 3in. by

2ft. 6in.

1 Do., but with pediment on one

side.

## WINDOW TO CUPBOARD.

1 6

3 9

5 8 1/2 B. deduct.

2 0

4 0

8 0 1 B.

1 6

4 1/2

7 Extra to cut; rubbed, gauged,

and flat arch in red bricks.

1 7

9

1 2

T. P. 4 1/2 S.

1 6

9

1 6 Fair cutting to skewback.

2 10

Deduct extra to red brick facing.

1 fir b. and p.

6 Deal joint bricks.

3 0

Extra to glazed brick facing.

1 0

Add.

Extra to butts nose angle.

2 M.

9 Extra to flat arch in glazed

bricks.

1 7

4 by 3 fir wrought, framed, re-

bated, and bd. framed.

4 by 3 oak sill as before.

2in. deal moulded casement on

butts as before.

1 pair 3in. butts.

lin. japanned iron lever casement

fastening.

1 do. lever stay.

3 11

21cz. shee; glass in small squares.

(4) fir.

1 casement.

3 squares.

(4) and twice V frame.

1 Casement.

3 Squares.

Galvd. iron tong., &amp;c., as before.

## GIRDERS TO CARRY WALL OVER BATH SPACE.

2 16 0 32 0 R.I. girder weighing 32lb. per  
foot run, and hoisting and fix-  
ing 15ft. from ground level.



	ft. in.	ft. in.	
2	16 0	101 4	(4) on iron.
	8 2		
2	16 0	24 0	2in. York stone self-faced coped to widths.
	0 9		(4) 3in. tooled York templates, 12in. by 12in. set in cement.
			2 ventilating pipes to w.c.'s.
			Do. inspection chambers.
			STAIRS.
2	11 0	22 0	1in. deal rounded nosing to landing.
			4 M.
			2 Mitred returned rounded ends.
2	6 0	6 0	1in. deal wrought framed riser.
	6 6	12 0	Scribing lin. to concrete step.
20	3 9	75 0	12 by 6 patent concrete steps square.
			40 Ends built in in cement.
			40 M.g. glazed brick facing to ends of steps.
			4 Winders patent concrete 3ft. 4in. by 3ft. 4in. by 6in.
			2 Ends built into wall in cement.
	3 9	7 6	R.I. joist in S.L. 10lb. per foot to support winders.
2	3 9	7 6	(4) on iron.
	1 0		2 Ends C. and P. in with cement.
	3 3		Portland concrete landing 6in. thick.
	3 6	11 5	3 3
	3 8	3 3	Edge of do. C. and P.
4	4 6	18 0	4 by 4 mahogany framed and turned newel and F.P.
			4 Turned cap to do.
2	3 6	7 0	3 by 2½ mahogany framed and moulded handrail F.P.
2	4 0	8 0	Add.
			4 End C. and W.
26	3 3	84 6	1½ deal framed turned balusters and (4) and twice V.
2	19 6	39 0	2in. dimr. polished brass handrail, including brass brackets and fixing in glazed brick wall.
			2 Extra to bend in do.
			2 Flanged end to do. and fixing with sc.'s to wood newel.
			2 Ornamental brass termination to 2in. diar. brass handrail.
			INTERNAL PLUMBER.
			2 Hospital bath of copper on wheels, with vulcanised india-rubber tires and washer and plug for emptying.
			The water supply to be carried out in accordance with the water-works company's regulations.
			It is supposed the cisterns and hot-water supply will be in an adjoining building.
			Provide 100ft. 3½in. strong lead pipe, digging trench for and laying in same earth returned and well rammed.
			2 Plain white washout closet, list price £3 16s. 0d., and fixing with clean deal hinged seat on brackets in addition.
			2 Approved water waste preventers, price 25s., with galvanised iron chain and handle, and fixing on proper brackets with overflow pipe.
2	7 0	14 0	1½ lead flushing pipe.
	5 0	10 0	½ lead supply to w.w.p.
			2 ½ soldered joint.
2	3 0	6 0	¾ lead supply to sink.
			2 ¾in. soldered joint.
			2 ¾in. brass screw-down tap.
			4 White enamel hospital sink, 3ft. 6in. by 2ft., with brass grating and fixing on proper fir bearers.
2	5 0	10 0	2in. lead waste from sink.
			6 ¾in. brass hot water screw-down tap to sinks and for baths.
6	3 0	18 0	¾in. W. I. pipe for hot-water supply to sink and (4).
2	64 0	128 0	¾in. W. I. hot-water pipe, provisional and fixing, and (4).
			N.B.—The price for W. I. pipe to include for elbows, bends, short pieces, joint, connectors, &c., and fixing complete.
2	65 0	130 0	¾in. lead supply pipe to sinks in nurses' rooms (provisional).
4	3 0	12 0	Add.
			4 ¾in. soldered joints.
			4 ¾in. brass screw-down bib cocks for sinks in nurses' rooms, and draw-off for bath.
			Provide the sum of £ for electric bells.
			Provide the sum of £ for gas pipes, fittings, and fixing.

A window erected in memory of the late Sir Watkin Williams Wynn, Bart., in Ruabon parish church, was unveiled on Sunday morning. The window, which is given by the widow, was designed by Mr. Curtis, and put in by Messrs. Ward and Hughes, of London.

## ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

**BIRMINGHAM ARCHITECTURAL ASSOCIATION.**—The new session of this Association opens on Wednesday next, and promises to be a successful one, there having been recently a substantial increase in membership. The following is the syllabus:—Nov. 14, *Conversazione*; Nov. 20, "The Affiliation of Architectural Student Societies," H. D. Appleton, F.R.I.B.A., P.A.A.; Dec. 4, "Edington Church, Wilts," with illustrative drawings, C. E. Ponting, F.S.A.; Dec. 18, "Pompeian Art," Whitworth Wallis, F.R.G.S.; Jan. 9, Presidential Address, T. Naden; Jan. 22, "The Examination in Architecture and the Necessary Preparation," F. R. Farrow, A.R.I.B.A.—discussion to be opened by Prof. Robert Smith, Mason Coll.; Feb. 5, "Decorative Art and Fashion," J. Ward; Feb. 19, Paper by W. Doubleday, Vice-President; March 5, "Vienna," with illustrative photographs, T. Blashill, F.R.I.B.A.; March 12, Paper by W. Henman, F.R.I.B.A.; March 26, "Notes on Old Woodwork," with illustrations, W. H. Kendrick and H. H. McConnal, A.R.I.B.A.; April 9, Paper by J. A. Gotch, F.R.I.B.A.; May 7, "The Cross in Art," J. W. Tonks; May 21, Paper by W. H. Bidlake, M.A., A.R.I.B.A.

**MANCHESTER ARCHITECTURAL ASSOCIATION.**—The opening meeting of the fourteenth session of this association was held on Tuesday, the 6th. The president, Mr. A. H. Davies Colley, A.R.I.B.A., in his address, directed special attention to the work of the competitions committee of the R.I.B.A., and to the meagre response it had met with. In July last, out of 118 practising architects, only 47 had signed the memorial.

**EDINBURGH ARCHITECTURAL ASSOCIATION.**—At the meeting of this association, held on Thursday night, Nov. 1st, the president (Professor G. Baldwin Brown) delivered the opening address, taking as his subject, "Some Aspects of the Work of an Architectural Association." After referring to the constitution of the association, he asked what it could do for the benefit of the various classes of members composing it? The Architectural Hall should, he said, be made, first, a pledge of the solidarity of the architectural profession; secondly, a place of instruction, and still better of stimulus, for the younger members; thirdly, a centre of artistic influence that might affect the public at large. On the important questions of more formal union among Scottish architects, on architectural federation and the like, it became a layman to speak with reserve, but it was not satisfactory that there should be no body constituted for Scotland in general to represent architecture in questions, such as those of professional practice, which might from time to time arise. He desired to speak with all loyalty of the Royal Institute of British Architects—and a good solution might be found through some process of affiliation. In any case, they should strive for more solidarity among the members of the profession in Scotland. In the country generally there seemed too many local jealousies, too little united effort. The association this year was doing something towards this end by interchange of papers with other Scottish societies, meeting in common, and the like. It was proposed now to endeavour to systematise the classes of the association so as to make them a fit preparation for the examination of the R.I.B.A. The great difficulty was the want of any endowment. The younger members of the association might usefully start some educational work of their own. Why should not a club or society for design and decoration be formed? It would need a name and a sort of patron saint, and what name could be better than that of Robert Adam, who was as great in ornamental design as in monumental architecture?

The tender of Messrs. C. Kynoch and Co., of Clapham, has been accepted at £3,865, for the erection of the new free public library in Orlandoroad, Clapham, from designs by Mr. E. Blakeway l'Anson, recently selected in competition.

The Boys' Roman Catholic School, Dockhead, London, S.E., is warmed and ventilated by means of Shorland's patent Manchester stoves, supplied by Mr. E. H. Shorland, of Manchester and London. Mr. Leonard Stokes is the architect.

## Building Intelligence

**DUNBAR.**—The ceremony of laying the foundation-stone of a new Episcopal church at Dunbar was performed on Monday by the Earl of Haddington, the Lord-Lieutenant of Haddingtonshire. The new church, in design follows on the lines of the Scottish Mediaeval architecture. The plan shows a nave 68ft. by 24ft., with choir and sanctuary 34ft. 6in. long and the full width of the nave. Externally the chief characteristics of the design are the richly-traceried windows, between which there are large unbroken surfaces of solid wall. A large east window has been avoided, thus giving space for a high reredos. At present it is not intended to complete the building of the tower. The building is now being carried out under the supervision of Dr. Rowand Anderson, of Edinburgh, who is adhering closely to the original ideas of the late Mr. Wardrop. The cost of the portion now in hand will be £2,700.

**NEWCASTLE.**—The Princess Louise opened on Monday, the new College of Physical Science at Barras Bridge, of which the first section has just been completed from plans by Mr. R. J. Johnson, of Newcastle. The building is Early Jacobean in character, all the lights being filled with obtusely headed windows. The walls are of brickwork, with stone dressings, and the roofs are covered with Ruabon tiles. The portion built consists of the chemical and physical laboratories. The portion of the building now completed has cost £23,000, and is about one-third of the entire scheme. We published a sketch-plan of the site on Oct. 8th, 1886.

**OLDHAM.**—The new Oddfellows' Hall, Oldham, was opened on Saturday. On the ground floor are three lodge-rooms, each measuring 24ft. 9in. by 12ft., and a small concert-room 23ft. 6in. by 21ft. 6in., the whole being fitted up with lattice seating. The billiard-room, which is also on the ground floor, provides accommodation for two billiard tables. The bar is centrally situated. The assembly-hall is on the first floor, its dimensions being 64ft. 6in. by 36ft. The building is faced externally with local stock bricks, relieved with Ruabon terra cotta and sandstone dressings, the roofs being slated with Welsh slates, capped with Ruabon tiles. The contract for the work was let to Mr. Ed. Stephenson; mason, Mr. A. Staley joiners, Exors. of E. Whittaker; slater, Mr. Jos. Jackson; Mr. Lowe, Farnworth, supplied the wood-block flooring. The plans have been prepared by, and the work erected under the supervision of, Mr. A. Banks, architect, Union-street, Oldham.

### STAINED GLASS.

**EAST WICKHAM CHURCH.**—A three-light memorial window has just been fixed in the chancel here by Messrs. Jones and Firmin, of Blackfriars-road, S.E.

### STATUES, MEMORIALS, &c.

**GLASGOW.**—The spray fountain in the Glasgow Exhibition, made and designed by Messrs. M'Dowall, Steven, and Co., of Glasgow, has been presented by the makers to the city of Glasgow. The fountain is 20ft. 3in. high, and 28ft. 6in. in diameter over the parapet wall of the ground basin. There are three basins above this one, and the shaft is surmounted with the figure of a dolphin. The ornamentation is illustrative of marine life.

### WATER SUPPLY AND SANITARY MATTERS.

**KEGWORTH SEWERAGE.**—Mr. W. H. Radford, C.E., of Nottingham, has been instructed by the sanitary authority to take such levels as are necessary to enable him to advise them as to the best scheme for abating the nuisances caused by the delivery of sewage into certain dykes at the lower end of the town.

A stained-glass window, representing the "Last Conversation of Our Lord," is about to be placed in Bromyard parish church. Mr. H. J. Silsbury, of St. Alban's, Herts, is the artist.

New Conservative Club premises in Hanover Park-road, Peckham, erected from designs by Mr. H. H. Leonard, were opened last week, when the members of the club presented Mr. Leonard with his portrait.



TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions. Cheques and Post-office Orders to be made payable to JAS. MORE EDWARDS.

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We charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. Situation Advertisements must be prepaid. Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

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Find volumes should be ordered early (price Twelve shillings each), as only a limited number are done up. A new bound volume of Vols. XLII, XLVI, XLIX, L, LI, LII, LIII, and LIV may still be had, price Twelve shillings; all the other bound volumes are out of print. Lost of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print. Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—J. K. and Co.—H. A.—H. M.—N. M. B.—D.—N. R. and Co.—B. of K.—L. B. G.—J. T.—J. R.—T. T. and Co.—J. J. and Co.

Correspondence.

"ARTS AND CRAFTS."

To the Editor of the BUILDING NEWS.  
SIR,—Under this heading my attention has been called to a letter, signed "Vigilans," in the BUILDING NEWS of last week.  
I fear I have no time fully to debate the question of the principles on which the society have the honour to represent was worked; but I should like to say that the passage quoted as an "utterance" of mine is not mine, and therefore the remarks based on it fall to the ground.  
"Vigilans" must have been napping in regard to this. If there is one thing more than another I have endeavoured to make clear, it is the far greater demands on artistic capacity made by decorative art in its highest sense, as compared with purely pictorial art.  
As to whether our endeavours to bring forward the personal element in applied art is mere "catch-word," or "fad," the good sense of the public must decide; but, judging from the interest they have manifested in our exhibitions, they do not appear to share the views of "Vigilans."  
He appears so much to despise the idea of the designer and craftsman having due credit for his work, and so content with the present arrangement, whereby the manufacturer usually gets all this credit, as well as the profit, that I would suggest to him to try and persuade pictorial artists to sink their names under those of eminent dealers, and then see what would happen to our painters—they have not quite time to that yet.—I am, &c.,  
Nov. 7, WALTER CRANE.

STRAINS.

SIR,—In your last issue, Mr. Sydney B. Beale complains of my having used two different expressions (which he says are in conflict) to express the same meaning. If he will look further into the matter, he will see that they are practically convertible terms, for the utmost load which a structure will sustain without failure is infinitesimally near to that under which it will succumb.—I am, &c.,  
G. A. T. MIDDLETON.

BRISTOL CATHEDRAL.

SIR,—Will you correct, in your next impression, a statement in your account of Bristol Cathedral, which ascribed the design of the upper part of the west towers to me, instead of to the late Mr. Street? My undertaking was merely to complete his work, and for which there were sufficient drawings.—I am, &c.,  
JOHN L. PEARSON.  
13, Mansfield-street, Portland-place,  
London, W., Nov. 5.

Intercommunication.

QUESTIONS.

[9815].—Architects' Charges.—A school board having engaged an architect's services, approve of plans sent in pencil and are pleased with same. The set of plans are then finished, also part quantities. Later the Ed. Dep. disapprove of them—not through any clerical error, but through a change of architect to the dep., who has different ideas to the last—and suggest certain alterations, these necessitating an entirely new set of plans, which is made and carried out. In this case can the architect charge for the first set of plans, and if so what? In another case plans are drawn out, finished, and passed, but owing to a change of site are useless. A second set is drawn and carried out. What is the correct charge for the first set? The specifications in both cases required but little alteration. Answers to the above will greatly oblige.—AN INJURED ONE.

[9816].—Lights.—A is a building used as a club, B is a piece of land adjoining on which it is proposed to build lofty business premises. In about the centre of A's wall there are windows forty years old overlooking B's land. If B builds in front of A's windows blocking out the light, are the members of the club within their rights in knocking down the wall? Secondly, can A demand a greater width of space than the width of their windows—i.e. have they the right to a side-light as well as a direct one in front?—A SUBSCRIBER FOR SIXTEEN YEARS.

[9817].—Electric Lighting of Business Premises.—Can any of your readers kindly inform me what is the best and cheapest description for lighting premises by the storage system? I have an engine in constant daily work, where I propose making the electricity, and want to make it there, and take in some vessels to be used at some 200 or 300 yards' distance.—T. L. B.

[9818].—Half-Timber.—Could one of your practical readers give me a sketch section through sill, showing connection with floor joists of timber framing above a 16in. cavity ground-floor? I want the framing to project about 8in., with corbels, and not brackets. The bottom of the sill of framing to come on a level with ceiling line. The house is to cost about £4,000, so I want a substantial job.—NOVICE.

[9819].—Cement, &c., Measure Boxes.—My specification reads as follows:—"Concrete to be composed of 4 parts broken metal, 1½ in gauge, 2 parts sharp sand, and 1 part Portland cement. Please give length, breadth, and depth for each gauge-box—viz., metal, sand, cement, and oblige.—SUBSCRIBER.

[9820].—Estimate.—Would some reader of the "B. N." kindly answer the following:—1st. What is the best way of estimating the cost of a church? 2nd. What is the best way of estimating the cost of a school? These buildings, having such large floor space, is it not unsafe to depend on cubing?—YOUNG.

[9821].—Mounting Ordnance Maps.—Which is the best way of mounting Ordnance maps? I want to mount eight or nine sheets, each 3ft. 6in. by 2ft. 4in., to form one map to roll up. What kind of paste and canvas should be used?—H.

[9822].—Ancient Lights.—Am I to understand from the answers of "H. L." and "G. H. G." concerning light, that 20 years' possession is required to obtain that prescriptive right? I understood it to be now 12 years.—D. I. T.

[9823].—Drawings.—Is it usual, in the case of erecting public buildings for town authorities, for the original drawings and specification to be demanded by the town clerk so as to be attached to the contract and kept in his archives, the architect to work from tracings during the erection of the building, and also to supply tracings to the contractors, thus making two sets? An answer from someone who has had experience in such work will oblige.—OBJECTOR.

[9824].—Cremation.—Will any of your readers kindly inform me of a good work on the above subject?—whether it is in vogue on the Continent, if so, where? Probable cost and any information will oblige.—CONSTANT READER.

[9825].—Perspective.—In perspective of interiors of chapels, &c., having projecting galleries, is it necessary to limit the width of the picture to the width of the plan between the galleries, drawing the picture plane across from gallery to gallery? If the limits of my picture take in more than this, I find that the galleries show as if cut off in section, and that I cannot prolong them to the edges

of the picture. Also, is it advisable to arrange the angle of vision as to take in the same extent of side wall or gallery on one side as on the other.—NO SIG.

REPLIES.

[9791].—Dated Examples of Half-Timbered Houses.—Among the dated examples of timber construction of the sixteenth and seventeenth centuries may be mentioned the Guildhall, Lavenham, 1529; Ford's Hospital, Coventry, built in 1530, a florid and oft-illustrated quadrangle still inhabited by bedesmen; house on south side of Water-gate-street, Chester, dated 1539; at Basingstoke is one of 1540; Rowley Hall, Burnley, 1543; Little Moreton Hall, 1519; in Norwich is a wooden and flint-faced house in St. George's, Colegate, 1566; Mayfield, Sussex, 1575; Whitehall, Shrewsbury, is a gabled building of 1578, but in its construction a good deal of brickwork is employed; Bellstone House, also in Claremont-street, Shrewsbury (1532), is half-timbered, with excellent gables; Great Tangley Manor House, Surrey (1582), has richly-carved corbels; Peasington Hall, Blackburn, 1587; the Bishop's House, Wurzburg (1590), is a rich example of the Transition period, being Gothic in picturesque and Renaissance in details—the staircase was illustrated by a sketch in the BUILDING NEWS of the 28th ult., p. 533. In Shrewsbury Market-place are houses dated 1590 and 1591; one of the half-timbered houses in Stratford-on-Avon was built in 1591, another in 1596; the quaint front and timber porch of Exeter Guildhall were added in 1593 to a building completed in 1481; Frodesley Hall, Salop, 1594; and Speke Hall, ten miles from Liverpool, a fine specimen of Lancashire mansion, having this inscription carved on the porch:—"This worke, 25 yarde long, was wolly built by Edw. N. [Norrey], Esq., anno 1593." Passing into the next—the seventeenth century—"Particular Peter" may be referred to a house on Camp Hill, Birmingham, having "1601" cut on the porch; Hale Hall, on the Lancashire bank of the Mersey, the north front of which was completed in 1603; the Bear and Billet, Lower Bridge-street, Chester, built in 1605; Moreton Corbett Hall, Shrewsbury, begun in 1606 and never finished; a house in Claremont-street, Shrewsbury, 1613; old Hall, Bold, St. Helen's, Lancashire, 1616; and to Leicester's Hospital, occupied before 1617, an exceedingly picturesque cluster of timber-fronted dwellings, invaluable as a link of evidence as to the period when half-timbering was being superseded by the more prosaic brick construction; Rowley's Mansion, Shrewsbury, was built in 1618. At Hildesheim, near the Rhine, was the finest house of its class, built 1620, but unfortunately destroyed by fire—many illustrations recall its appearance. Then we have the timber house at Hereford (1621), recently restored; Grangehouse, Leominster, 1633; those in Church-lane, Ledbury, 1634; Dartmouth, 1635, an exceptionally fine example, having oriel bays, carved with figures, and another in the same town, 1640; Kenyon Peel Hall, Tydesley, 1637; plaster-fronted dwellings at Oundle, dated 1638, 1641, and 1650 respectively; the White Lion, Higham Ferrers, 1641; Severn and Worcester, of which the central portion was built by a Lechmere in 1641, and the side wings added in 1673; Hall in the Wood, Bolton, 1643; Watergate-street, Chester, 1652; Lynn, 1660; Bridge-street, Chester, 1668; Market Hall, Ledbury, a plain timber and plaster detached structure, built from designs by John Abel, who died 1674.—EAST ANGLIAN.

[9802].—Licenses.—1. Any surveyor can survey land (lay out land) for building, also let or sell plots without a house-agent's license. 2. No license is required for selling houses by private contract.—H. L.

[9805].—Church Corner or Foundation Stones.—There is a tradition that the corner or foundation stone is always laid at the north-east corner of the building, so that in a church a good place for the stone would be in the north-west pier of the chancel arch (near where the pulpit is usually placed), as that position is near enough to the correct one, and is visible without entering the chancel.—H. L.

[9811].—"Stucco" and "Compo."—These terms are almost obsolete. The work is now generally described as "render in Portland cement," but workmen frequently use both words, which are synonymous.—H. L.

[9812].—Metropolitan Building Act.—If "Quandary" cannot study the Act as given in Laxton's "Price Book," he should get the book by Mr. B. Fletcher; but surely nobody but speculative builders would desire to "circumvent the district surveyor's wiles," but rather would endeavour to plan the building so as to give him very little trouble and avoid unpleasantness.—H. LOVE-GROVE.

[9812].—Metropolitan Building Acts.—Any person of ordinary intelligence had better study the various Acts themselves as compiled in the MacNamara edition of Woolrych. This volume is a handy size, and can be bought for about 7s. I think "Quandary" is not so polite to district surveyors as he would be if he knew them better, and could understand and appreciate the difficulties with which they had to contend. I have had special facilities for studying this subject, and should be pleased to put "Quandary" in the right way to master it.—A. O. COLLARD, 8, Craig's-court, S.W.

[9812].—Metropolitan Building Acts.—"Quandary" can obtain the handbook he desires, and which deals with the various Building Acts in the Metropolis, by applying to the publisher at 4A, Portobello-terrace, Notting Hill Gate, W. The title of this work is "Rules and Regulations affecting Building Operations in the Metropolitan Area." I believe the price is 1s.—A. G. K.

[9812].—Metropolitan Building Acts.—"Quandary" is hasty in his conclusion: the district surveyor is what the Acts have made him. I know of no better nor more compact guide than Mr. Ellis Marsland's little book called "Rules and Regulations affecting Building Operations in the Metropolis," published at 4A, Portobello Terrace, Notting Hill Gate, W.—A SURVEYOR.

[9814].—Lighting Church by Gas.—"Telamachus" would find the best and most economical method (from our experience) to have pendants supported by small brackets in front of each arch of the nave, which would also light the aisles and standards for the chancel and choir seats.—J. W. SINGER AND SONS, Frome.



## Our Office Table.

THE mosaics for the decoration of the dome of St. Paul's Cathedral are to be proceeded with, and with this view for a short time past some cartoons from the designs of Mr. G. F. Watts, R.A., have been fixed on one of the pendentives. These drawings are to be taken down, and Dr. Salvati has now been commissioned to render them in mosaic. It will be remembered that one pendentive was executed some years ago from the same painter's designs, but nothing further was done pending the discussion concerning the larger scheme, on which the late Wm. Burges was engaged, and subsequently respecting the proposals for the treatment of the dome by Mr. E. J. Poynter, R.A., and Sir Fredk. Leighton, P.R.A. We hear that the decorations are to be carried out, after all, under the supervision of Mr. Francis Crammer Penrose, M.A., the cathedral surveyor, and that very likely some of Stevens's designs will be incorporated in the work. The pendentives will all have figures of the Prophets.

In a recent lecture on "Continuous Car Heating," before the Boston Society of Arts, Prof. Lanza stated that experiments showed that but a small percentage of the steam generated by the locomotive was required for heating purposes. The pipe supplying the steam from the engine should not be less than 1½ in. in diameter, whilst the radiating pipes in the cars should be 2 in. in diameter. The connections between the cars should be rubber, as all metal joints leak after a time, however carefully made originally. Direct steam must be used, as all plans for employing the exhaust for this purpose have failed. The principal difficulty met with on introducing the system was to get rid of the water formed by condensation, but satisfactory traps are now supplied.

Mr. Hutcheson, R.S.A., has just carried out a commission from Her Majesty to execute a bust of the Rev. Dr. Norman Macleod.

## MEETINGS FOR THE ENSUING WEEK.

**SATURDAY (TOMORROW).—**Working Men's College, 46, Great Ormond-street, W. "Cornwall and the Cornish," by Rev. H. C. Shuttleworth, M.A. 8.30 p.m.

**MONDAY.—**Royal Academy. Lecture on "Chemistry," No. 2, by Prof. A. H. Church, F.R.S. 4 p.m.

Surveyors' Institution. Opening address by the President, E. P. Squarey, 8 p.m.

Leeds and Yorkshire Architectural Society. Address by the President, H. Perkin. 8 p.m.

**TUESDAY.—**Society of Architects. Conversazione at the New Gallery of Arts and Crafts, Regent-street, W. Opening address by the President, W. H. Seth-Smith.

Institution of Civil Engineers. "Friction Brake Experiments," by W. W. Beaumont. 8 p.m.

**WEDNESDAY.—**St. Paul's Ecclesiastical Society. "The Actual uses of Colours in the Mediaeval Church of England," by W. H. St. John Hope, F.S.A. 7.30 p.m.

Birmingham Architectural Association. Conversazione.

Liverpool Art Workers' Club. Discussion on "The Art Congress."

**THURSDAY.—**Royal Academy. Lecture on "Chemistry," No. 3, by Prof. A. H. Church, F.R.S. 4 p.m.

Edinburgh Architectural Association. "The Aesthetics of City Buildings," by J. Crabb Watt, F.S.A. 8 p.m.

**FRIDAY.—**Architectural Association. "Arches and Vaulting," by A. T. Walmisley. 7.30 p.m.

Architectural Association. 9, Conduit-street, W.—Nov. 16, 7.30 p.m. A. T. Walmisley, Esq., on "Arches and Vaulting."

The foundation stone of a new church has been laid at Llanllwchaearn, near Newtown, Montgomeryshire. The church will be dedicated to All Saints, will be Early English in style, and will cost £3,000. Mr. Aston Webb, of London, is the architect.

Alterations have been made to the free library, Wimbledon, embracing the ventilation, which is now carried out on the Boyle system, the extraction of the vitiated air being effected by the latest improved form of the self-acting air-pump ventilator.

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## TENDERS.

Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1767.

FRIDAY, NOVEMBER 16, 1888.

## DANGERS OF RAPID REBUILDING.

THE rebuilding of old and demolished houses is being carried on with almost startling rapidity in the Metropolis. We almost begin to wonder where the rage for rebuilding will end. In a few months old streets are so far transformed in appearance that a casual visitor would have some difficulty in identifying the older localities. The outlying suburbs have indeed shown most of this activity in bricks and mortar; but in these, accessions have been made that have completely changed—we cannot say improved—the localities. We now dwell more on the rebuilt premises in the main London streets. Rebuilding is unusually active just now at the West-end, in the Charing Cross-road, and the adjacent thoroughfares, and also in the Strand. One of the noticeable things about this rebuilding mania is that the premises which take the place of the old are generally considerably higher, as if the main object was to put a double house on the same space of ground, and to charge double or treble the amount of rent. This feature of modern rebuilding is one that concerns not only landlords and owners, but adjoining owners, architects, builders, and the public. To the adjoining owner a lofty building on one side is often a serious matter. It dwarfs his house; if he has been spending money on the front by renovating or improving it, his labour and expense are to some extent thrown away. He may suffer substantial injury by the additional height of his neighbour's house in the matter of light; his back premises may be overshadowed and spoiled for future improvement. The right of the building owner to open windows overlooking his neighbour's land, and thus restricting its capabilities, is one of the grievances to which owners of adjoining houses are subjected. But the question of increasing the height of houses and shops in streets is one to which the attention of those called upon to administer the Building Act ought to be directed. It almost appears taken for granted that the same foundations which carried a house of four stories can be used for one of eight or ten stories. The question of frontage is not considered, the narrower the house, the higher it is carried. The only matter which concerns the officials appointed under the Act are the scheduled thicknesses of the party-walls and the by-law requiring the foundations to have concrete. Attention to the substrata or the weight to be put on the site does not appear to be bestowed in many cases. There is no section in the Act prohibiting the reuse of old party walls, or other portions of the old structure. A very large number of inside alterations to old houses and shops are carried on without the knowledge of the authorities; party-walls have been found out through to make space for show-rooms in a row of ordinary houses acquired at different times. Eventually the proprietor or tenant raises the structure, but without paying any attention to the nature of the foundations. Numberless buildings are raised one or more stories, but we have no evidence that those additions have been made under the control and restrictions of the surveyor. The terrible accident which took place in Great Titchfield-street, Oxford-street, the other day by a fall of a house, by which six men lost their lives and seventeen others were more or less injured, comes with a sad warning. All that we know is that the building which fell

formed one of two houses intended as shops, with dwelling-rooms above. The buildings are three-story, of yellow bricks faced with freestone, in which ironwork was used as girders. It was the last of the set standing on a site occupied by the "Queen's Head" publichouse, with a frontage to Great Titchfield-street, that fell. The building had been roofed in, and a number of workmen were at work on the premises when it suddenly collapsed. Of late years we have recorded several cases of houses that have given way without any sign. The only surmise in these cases is that there must be either something wrong with the foundations, or that some part of the structure was too weak to bear the weight put upon it. Sometimes bad workmanship has practically reduced the thickness of the walls, the load resting on a smaller section of brick or stone than it ought to have done. In the construction of composite walls—such as brick walls faced with ashlar—there is often a source of danger; the "backing" is badly bonded into the "facing," and takes a greater share of the weight than properly belongs to it. The two sections of the wall do not help one another—they practically reduce its thickness; in other words, if the brick settles, the weight is thrown on a few inches of facing.

The news of another fatal accident comes from New York, where two workmen lost their lives by the fall of the fifth floor of a building. The evidence published shows the worthless nature of official inspection in large cities. In this case the upper floor was overloaded with bricks by use of the hod elevator—an appliance which saves labour, but which rather encourages the piling of bricks on upper floors. There is undoubted risk in the rapidity with which building operations are carried on, especially in cases of rebuilding, and the tax upon district surveyors and building inspectors is becoming yearly more onerous.

## THE SYMBOLISM AND ICONOGRAPHY OF EARLY AND MEDIEVAL CHRISTIAN ART.—III.

By GEORGE ASHDOWN AUDSLEY, F.R.I.B.A.

(Author of "Handbook of Christian Symbolism," and several works on Architecture and Art.)

WE are as much indebted to M. Didron in connection with the subject of the Iconography of the Eastern or Greek Church, as we are with reference to the Iconography of the Western or Latin Church, as already pointed out. Had that great and enthusiastic archæologist not visited Mount Athos with the view of making himself acquainted with the system so consistently followed by the artists of the Byzantine school of painting, we should now, in all probability, be without one of the most valuable and instructive manuals on Mediæval Christian Art ever published—a manual which enables the student to master, with the minimum of trouble, the orthodox Iconography of the Eastern Church, and to follow it, step by step, throughout its entire range. The manual to which we refer is, in its original Greek form, entitled *Ερμηνεία της ζωγραφικής*; and in its French form, as published by M. Didron, in 1845, "*Manuel d'Iconographie Chrétienne*."

The Greek title signifies *Guide to Painting*; and under this English equivalent we shall invariably allude to the manual in our present treatise.

On visiting the great monastery of Esphigmenou, on Mount Athos, M. Didron found, in the hands of the monkish artist Joasaph, a manuscript which proved, on investigation, to be a copy of an original treatise on ecclesiastical painting, compiled by a monk named Dionysius from the executed works of Panselinos, of Thessalonica, a very celebrated painter of the eleventh century, whom

Didron calls, "the Giotto of the Byzantine School." The original treatise, which was probably written in the twelfth century, had been added to by successive generations of painters until it assumed the form of the copy in the hands of Joasaph; and Didron observed that it was undergoing extension by notes written by the artist from whom Joasaph had received the book, and subsequently by Joasaph himself. In this way, from century to century, the treatise had been added to; and in each succeeding copy the notes had been incorporated with the text, so that nothing might be lost that experience and increased knowledge had acquired.

From this book, a copy of which is preserved in every atelier on Mount Athos, the Greek painters have derived their inspiration and instructions during the past six centuries. M. Didron tells us that he also found a fine copy of the treatise in the hands of another talented painter, called Macarios. He says:—"Cette bible de son art était étalée au milieu de l'atelier, et deux de ses plus jeunes élèves y lisaient alternativement à haute voix, pendant que les autres étaient à peindre en écoutant cette lecture. Cette scène me rappela Namatia, femme de Namatius, évêque de Clermont en Auvergne, lisant au peintre qui décorait la cathédrale les histoires de la Bible que ce peintre devait représenter."\* It was through Macarios that Didron received the copy of the manuscript which was afterwards translated by his friend Dr. Paul Durand, and published, with his own notes, under the French title above named.

There can be little doubt that although it may not be possible to trace the origin of the *Guide to Painting* to a date anterior to the eleventh or twelfth century, there existed for a long time prior to that epoch some sort of recognised authority or iconographic manual; and there can be no question that the renowned Panselinos, of Thessalonica, strictly adhered either to traditional or written rules, which doubtless had their origin as early as the time of Justinian; and which had been handed down from century to century, and from artist to artist, in a gradually accumulating form. Under no other hypothesis can the absolute uniformity which pervaded the iconographic system of the Eastern Church in all epochs be accounted for. M. Didron found Joasaph painting the walls of the great church at Esphigmenou, which had only recently been erected, with sacred subjects and figures, which, in point of general treatment, and essentially in point of dogmatic detail, were identical with all the other, and in many cases ancient, paintings which adorned the numerous churches on the holy mountain, in Athens, Salamis, and elsewhere in Greece.

Didron makes a few very interesting remarks on Joasaph's method of carrying out the decoration of the church; and these may be given in his own words:—"Le premier couvent où nous entrâmes, en pénétrant dans le mont Athos, fut celui d'Esphigmenou. La grande église, nouvellement bâtie, était en ce moment même échafaudée; un peintre de Karès, aidé par son frère, par deux élèves, et deux jeunes apprentis, couvrait de fresques historiées tout le porche intérieur qui précède la nef. Le premier des élèves qui était diacre et le plus âgé, devait reprendre l'atelier à la mort du maître.

"Ma joie fut grande de ce hasard heureux qui paraissait me livrer le secret de ces peintures et de ces peintres, et qui répondait ainsi aux inutiles questions que j'avais faites à Salamine et dans la ville d'Athènes. Je montai sur l'échafaud du maître peintre, et je vis l'artiste, entouré de ses élèves, décor-

\* This incident is recorded by Gregory of Tours (*Historia Eccles. Francorum*), who wrote at the end of the sixth century. The incident dates about the year, A.D. 425.]



ant de fresques le narthex de cette église. Le jeune frère étendait le mortier sur le mur; le maître esquissait le tableau; le premier élève remplissait les contours marqués par le chef dans les tableaux que celui-ci n'avait pas le temps de terminer; un jeune élève dorait les nimbos, peignait les inscriptions, faisait les ornements; les deux autres, plus petits, broyaient et délayaient les couleurs. Cependant, le maître peintre esquissait ses tableaux comme de mémoire ou d'inspiration. En une heure, sous nos yeux, il traça sur le mur un tableau représentant Jésus-Christ donnant à ses apôtres la mission d'évangéliser et de baptiser le monde. Le Christ et les onze autres personnages étaient à peu près de grandeur naturelle. Il fit son esquisse de mémoire, sans carton, sans dessin, sans modèle. En examinant les autres tableaux qu'il avait terminés, je lui demandai s'il les avait exécutés de même; il répondit affirmativement, et ajouta qu'il effaçait très-rarement un trait qu'il avait une fois tracé."

The certainty and apparent ease with which Joasaph executed and controlled the paintings struck Didron with astonishment; for, apart from mere executive skill, there appeared to be a prodigious exercise of memory. At this time Didron was unaware of the existence of any written guide to the Greek artist. In his own words it will be seen how he first became acquainted with this treasure:—"Pendant que Joasaph, le peintre d'Esphigménou, me donnait ces détails, il n'en continuait pas moins ses esquisses et ses peintures; et moi, toujours de m'extasier devant sa prodigieuse facilité et son étonnante mémoire. 'Mais, monsieur,' me dit-il enfin, 'tout cela est moins extraordinaire que vous ne dites, et je m'étonne de votre surprise, qui augmente loin de cesser. Tenez, voici un manuscrit où l'on nous apprend tout ce que nous devons faire. Ici, on nous enseigne à préparer nos mortiers, nos pinceaux, nos couleurs, à composer et disposer nos tableaux; là, sont écrites les inscriptions et les sentences que nous devons peindre, et que vous m'entendez dicter à ces jeunes gens, mes élèves.'

"Je saisis avec empressement, avec avidité, le manuscrit que me montrait Joasaph, et je lus en effet, à la table des chapitres, que l'ouvrage se composait de quatre parties. Dans la première, qui est toute technique, on expose les procédés de peinture employés par les Grecs, la manière de préparer les pinceaux et les couleurs, de disposer les enduits pour les fresques et les tableaux, et de peindre sur ces enduits. Dans la seconde partie, sont décrits, en détail et avec une précision remarquable, les sujets de la symbolique, mais surtout de l'histoire que la peinture peut représenter. La troisième partie détermine le lieu où il convient de placer tel sujet ou tel personnage de préférence à tel autre, dans une église, un porche, un réfectoire ou une fontaine. Enfin, un appendice fixe le caractère du Christ et de la Vierge, et donne quelques-unes des inscriptions qui abondent dans les peintures byzantines."

The First Part of the *Guide to Painting* is of a purely practical or technical character throughout, and, as such, is of great interest to the student of early art. In this respect it may well be placed side by side with the instructive and curious art treatise of the monk Theophilus. It is not with this part of the Byzantine manual, however, that we are specially interested: it is with the peculiar manner of representation, the composition, and disposition of the sacred portraits and subjects, and not with the processes employed in their execution that we have to do.

In the Second Part we find concise and clear directions for the representation of the entire series of sacred histories and por-

traitsures used by the Greek Church. It may be mentioned that at no epoch of Byzantine art was the skill of the sculptor encouraged; for the Eastern Church has always objected to sculptured figures such as the Western Church has systematically delighted in at all periods of her history. Painting was, accordingly, developed and carefully systemised as early as the time of Justinian; and it is not too much to say that what was practised then has undergone no essential alteration since. Once the Church directed or approved any mode of representation, that mode became fixed, and was never departed from by subsequent artists. It is this fact which makes the *Guide to Painting* so trustworthy and valuable to the student of Christian Iconography.

The Second Part of the manual opens with instructions for the representation of the Nine Choirs of Angels, according to the system of St. Dionysius the Areopagite. Then follows the mode of depicting the Fall of Lucifer. In the scenes of the Creation it is somewhat remarkable that the *Guide* omits to mention all those which precede the creation of man. The missing links between the calling of the angels into existence and the creation of Adam are, however, filled up to the satisfaction of the student of Christian Iconography, in this school of art, by the admirable series of mosaic pictures which adorn the walls of the nave of the Cathedral of Monreale, near Palermo; all of which were executed by Greek artists, and no doubt in some observance of traditional rules. We shall have again and again to speak of the mosaics of this interesting and unique building in the present treatise; and the complete series of the scenes of the Creation will be illustrated in due course.

From the creation of Adam, onwards, the order of the events, which are treated of in the *Guide*, is strictly chronological and historical. In this respect, at least, the Byzantine system differs from all the Western iconographic systems, which were essentially symbolical, typical, or philosophical, with the historical aspect observed only so far as was agreeable to the teaching aimed at. In the Byzantine system we must, however, recognise, in the purely chronological arrangement, a careful selection of subjects which display the entire scheme of prophecy in the Old Testament history and its fulfilment in that of the New Testament. Nothing which could display the consistency of the ancient Law and the Gospel was intentionally overlooked.

A brief synopsis of the contents of the Part of the *Guide to Painting* now under consideration may not be out of place or uninteresting here.

The Part begins, as has been before remarked, with instructions for the representation of the Nine Choirs of Angels—Thrones, Cherubim, Seraphim, Dominations, Virtues, Powers, Principalities, Archangels, and Angels. The Tetramorph is also described. This introductory division is terminated with the Fall of Lucifer.

The history of mankind now opens with the Creation of Adam; and fourteen subjects are devoted to the life of Adam and Eve, closing with that in which Adam and Eve weep for Abel. Here the first words relating to the future are directed to be inscribed. The angel which appears in this scene of human sorrow bears a scroll with the words: "Weep not, for he shall again arise at the last day." Didron comments on this message: "Au moment où la mort paraît, la résurrection est révélée au genre humain."

Six subjects are devoted to the life of Noah, terminating with the Intoxication of Noah and the sin of his son Ham. Then follows the Building of the Tower of Babel. To Abraham and the chief events of his life are devoted nine subjects, terminating with

the Sacrifice of Isaac. Then follow, in order, one hundred and four scenes from the lives or histories of Jacob, Joseph, Moses, Joshua, Gideon, Samson, Samuel, David, Solomon, Elijah, Elisha, Isaiah, Daniel, Jonah, and Job; including the Plagues of Egypt, the Fall of Jerusalem, and the subject of Judith slaying Holofernes.

Then follow directions for the portraits of the Patriarchs, Prophets, Kings, Righteous Men, and Holy Women of the Old Testament.

The complete series of subjects, devoted to the illustration of the wonders of the ancient Law, terminates with instructions for the representation of the Philosophers of Greece who were believed, in the early ages of the Church, to have prophetically alluded to the Incarnation of God—namely, Apollonius, Solon, Thucydides, Plutarch, Plato, Aristotle, Philo, Sophocles, and to these are added Thoulis, an Egyptian king, Balaam, and the Wise Sibyl. These all have inscriptions, from their writings or sayings, which contain the prophetic or mysterious allusions to the Incarnation and the Trinity, which have won them a place in Christian Iconography.

Now, as if to form a connecting link between the Old and New Testament series of subjects, comes the directions for the representation of the Tree of Jesse. The picture outlined by the *Guide to Painting* differs somewhat from the Tree of Jesse as met with in our Western art. In addition to the figures strictly belonging to the genealogical tree, the Prophets of the Old Testament and the Philosophers of Greece, each holding an inscribed scroll and pointing to the Nativity of Christ, which crowns the entire composition, are introduced.

The New Testament or Gospel series of subjects opens with the Annunciation. From this seventy-six subjects are devoted to the Life of Christ previous to His Passion. Thirty-five scenes are devoted to the Passion, commencing with the Compact between Judas and the Jews, and ending with the Descent of the Holy Spirit. The Parables are given in a series of forty subjects. Here terminates what may be called the historical section: but the *Guide* goes on to describe three grand iconographic subjects, commonly painted on the cupolas of Byzantine churches—namely, the Divine Liturgy, the Apostles receiving the Body and Blood of Our Lord, and the Reunion of all Spirits.

Instructions follow for the representation of the Apocalypse, in twenty-four pictures; the Second Coming of Christ and the Last Judgment, in two grand pictures; and the Feasts and Stations of the Mother of God, in thirty-five subjects. Then follow brief directions for the portraits of the Evangelists, Apostles, Doctors of the Church, Bishops, Saints, Martyrs, Poets, and the Righteous; also for the representations of the Exaltation of the Cross, the Exaltation of Holy Images, the Seven Holy Synods, the Miracles of the Angels and Saints, the Martyrs of the Calendar, and Allegories and Moralities.

The Third Part of the *Guide to Painting* commences with the most interesting directions for the disposition and arrangement of the foregoing subjects on the walls and ceilings of churches and ecclesiastical buildings: and it concludes with an Appendix, commenting on the painting of sacred images, and giving an important list of expressive inscriptions. It is unnecessary to be more explicit on the contents of this most interesting and instructive manual in these introductory articles, especially as we shall have to speak at length on nearly all the iconographic subjects in the course of the treatise now commenced. The *Guide to Painting* furnishes the student of Christian Iconography with the ready means of



instituting a comparison between the systems followed by the Eastern and Western Churches; and this comparison is both interesting and instructive.

In the form of an executed series of subjects, in general accordance with the Byzantine iconographic system, perhaps the most interesting, and certainly the most accessible, is that presented by the cathedral of Monreale, in Sicily. The mosaics, which almost cover the walls of this unique structure, were executed at the end of the twelfth or the beginning of the thirteenth century, and by Byzantine artists. Of course, extensive as the series of subjects is, we cannot expect to find all the subjects treated of in the *Guide* on the walls of a building of such moderate dimensions; but it is somewhat remarkable that we find many subjects not touched upon in the Byzantine manual at all. Take the series of pictures illustrative of the Creation as an example. On the upper portion of the walls of the nave is the series of pictures just alluded to; commencing with one which represents what is conveyed by the words of the second verse of the first chapter of Genesis in certainly a most graphic and symbolic manner, and ending with the Rest of the Creator as expressed in the second verse of the second chapter of Genesis. Of the eight scenes embraced in this series only one—the Creation of Adam—is given in the *Guide*. In addition to this noteworthy difference between the schemes, we may observe a continued departure with reference to the series of events which immediately follow the Creation. There are certain events recorded on the walls of the cathedral which the Byzantine manual does not mention, whilst the manual describes scenes not to be seen in the mosaics at Monreale. We cannot help believing that, whilst the general scheme of the iconography of this church is Byzantine, there was a Western influence at work. This scheme, as it exists, has all the semblance of a link between or a combination of the iconographic systems of the Greek and Latin Churches. In this respect it would be quite in accord with the architecture and circumstances of the building. Be this as it may, there can be no question that the mosaic pictures in the cathedral of Monreale are of immense interest to the student of Christian Iconography, from whatever aspect they are viewed. This we hope to satisfactorily prove before the conclusion of our present undertaking.

In addition to the fertile fields of study and investigation already briefly alluded to, we have other important ones in the works of the mediæval painters of the Latin Church and in the countless miniatures stored in the pages of illuminated manuscripts and in the interesting woodcuts in the early printed books. Everything, in short, of an artistic nature, which has been created under the influence of the Christian religion, furnishes materials for such a treatise as we have entered upon. We can only trust that our labours, imperfect and insufficient as they must of necessity be, may be found as interesting to the reader as they have proved to the writer.

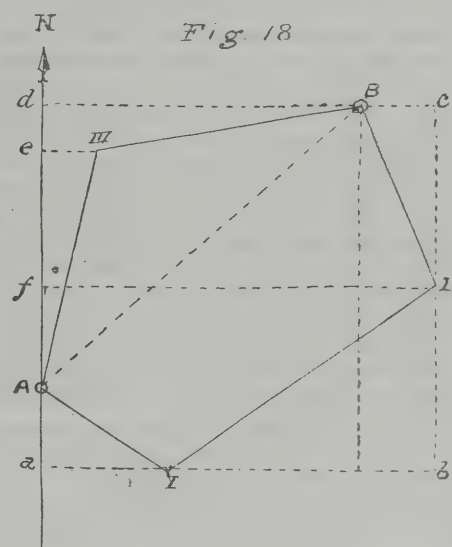
**ERRATA IN ARTICLE II.**—As the Article which appeared in the issue of October 5th went to press without having undergone revision and correction by the author, the following errata have to be noted:—In second column on p. 432, line 6, for *dernier*, read *dernier*; line 7, for *le trois*, read *les trois*; line 9, for *portal*, read *portail*; line 17, for *la quatrième*, read *le quatrième*; line 18, for *Tel*, read *Telle*; line 19, for *du pierre*, read *de pierre*. In third column on p. 432, line 30, for *ell*, read *elle*; line 36, for *de statuaire*, read *de la statuaire*.

(To be continued.)

## LAND SURVEYING.—XII.

THE TRAVERSE—PLOTING BY THE MERIDIAN, AND PERPENDICULAR SYSTEM.

THE system of surveying which we have endeavoured to make clear to the student is one that has found favour with many surveyors at home and abroad. In the colonies this plan of surveying, known as the meridian and perpendicular system, has largely been practised, and, as will be seen, it is one that, while based on strictly trigonometrical principles, is well adapted for small surveys, as being less complicated and difficult than the geodetical system. In our last article we explained how accurately and expeditiously the outline of a large survey such as a town can be plotted by means of two sets of lines at right angles to each other, by means of traverse tables. The chief merit of this plan, which we may call the meridian and perpendicular system, is that the protractor is superseded. To plot with any accuracy with the protractor it is necessary that minutes as well as degrees should be set off, and for this purpose the larger the diameter of the circle the better. The method of protracting is suitable for surveys to a small scale: it is an expeditious method,



as by the parallel ruler any bearing can be carried to any part of the paper, as we have previously shown. If one of the sides of a triangle is laid down by a protractor, and its length measured by scale, the other two sides can be accurately obtained by intersection with the compasses. But by the meridian and perpendicular method each line can be laid down with greater exactness by setting off on the axes at right angles to each other the distances north or south and east or west of the station. These distances on the meridian and perpendicular, or the cosine and sine respectively, can be calculated from the bearing of the line and its length, which is assumed to be the hypotenuse. Thus, taking the last figure, p. 566, AB is a measured line, and its position can be determined by laying off the length AB on the meridian and BB on the perpendicular. Or BB is the sine and AB the cosine of the angle BAA. But if we measure through A AB then AB is the sine and AA the cosine. Of course, it is immaterial which angle we measure, a point that is made plain in looking at the dotted lines.

In plotting a large plan it is necessary to adopt some mode of reducing a traverse to the meridian and perpendicular. We have shown one method of doing so by use of traverse tables, and by two lines, a meridian and a plane of latitude. To those who desire to pursue the subject we recommend Mr.

Penman's very useful work, "Land Surveying on the Meridian and Perpendicular System," where the system is thoroughly investigated, and the form of field-book shown. In traversing by a series of routes from one point A to another B, it is necessary that the position of B thus obtained coincides with its position found by another direct means. Thus, in Fig. 18, in traversing from A to B, by taking the sides AI, IIL, IIB, it is important that these several lines of the traverse should equal the meridian and perpendicular distances A d to dB. By adding like and subtracting unlike signs, the position of the point is determined. Thus, point I in relation to A is, Aa south and aI east, and line IIL is, bII north and I b east; or by adding and subtracting AII = Aa - bII = Af north and aI + I b = fII east = meridian and perpendicular of II from station A. Point B is also IIc north, and Bc west; therefore IIc + Af = Ad north, and fII - Bc = dB east = meridian and perpendicular of AB. The bearing and length of AB can be tested independently by taking the meridian and perpendicular distances Ad and dB, two sides of the right-angled triangle. Thus the accuracy of the traverse is proved. The other sides, BIII and IIIA, are similarly obtained, but the direction is reversed—that is to say, the lines are in a westerly direction, and the distance from B to A west must equal the total distance from A to B east; in other words, the eastings must equal the westings, and the northings the southings. The note-book should be ruled into five columns; in the first are placed the letters of the station, and the next two are devoted to the distances on the meridian. Thus the northings are entered in one of the columns, and the southings in the other; the other two columns are devoted to eastings and westings on the perpendicular. The balancing of each pair of columns can thus be easily made, and the error, if any, ascertained by finding the difference.

From the nature of the traverse and the imperfections inseparable from instrumental observations, there is generally found to be some error, however small. The lines of the traverse do not always close—that is to say, the closing bearing shows a discrepancy. To eliminate possible errors it is necessary in the field to repeat each operation at every station, and to make sure of every measured line by repetition. We have already pointed out the necessity of setting the instrument upon the converse reading of the back bearing in every case.

Some useful rules are necessary to be observed in taking a traverse. The poles at the stations should be placed at convenient points for observation and chaining; the lines of the traverse should be as long as possible, having reference to short offsets; the ground selected should be as level as possible; and as many check bearings should be taken as circumstances will permit. As regards traverse errors, some surveyors divide the error by the number of lines in the traverse, which is an approximate mode of correction, though as the lines differ in length, the most reasonable way of distributing the error is to do so in proportion to their lengths, as the longer the line the greater the initial error of, say, a few minutes is at the end of it.

The beginner in field work will do wisely to exercise himself with taking a few traverse lines for practice. In every case the standard bearing has to be noted at the commencement, to which bearing the instrument must be set. The standard bearing should be selected as the one which is connected with the initial point of the survey. Thus, to take the figure shown in the diagram. Commencing at A, the theodolite would be first directed to B (say 50°). The first traverse line is AI. Release the upper plate and turn instrument round to right, and observe

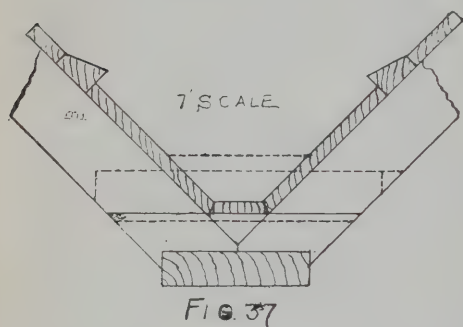


angle (say  $120^\circ$ ). Next turn instrument round in the same direction again upon B, to be sure of the reading. Repeat observation on I, and then proceed to chain A I. Take all the offsets. Remove instrument to station I, adjust it, and set limb to the converse or back reading ( $300^\circ$ ), then direct it to the next station II, and so on, taking care to read the bearings from each station twice, and the back bearing. It is necessary always to take the reading to the foot of the pole as being more correct, and in turning the instrument care is necessary not to overshoot the pole; but after clamping the upper plate to use the tangent screw so as to bring the hairs to intersect the pole to a nicety. A useful rule in observing triangulation angles is to turn the instrument always to the right, so as to avoid reversing or shifting the lower plate. Many surveyors are particularly careful not to reverse the upper plate, and if they happen to overshoot the station or pole, they turn the upper plate entirely round till they bring the instrument to the mark. The most efficient means of checking the traverse is to observe other stations within or without the lines of the traverse, and a system of triangulation in connection with it insures accuracy. The instrument should never be removed from one station to another till all the objects and stations have been observed and noted; in this manner accuracy and expedition are secured.

#### CARPENTRY AND JOINERY.—VI.\*

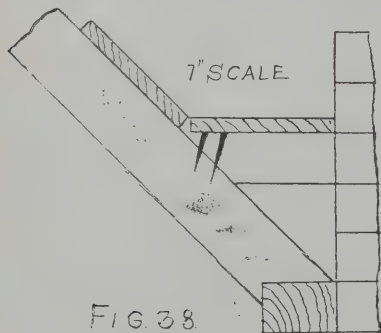
##### ROOFING (continued).

WHEREVER a valley is formed, either by one roof meeting another at an angle, or two sets of rafters meeting on a wall-plate common to both, as in Fig. 37, or a roof which



has a parapet wall immediately in front of it, as in Fig. 38, or in any similar case, preparation has to be made in order that this valley may be leaded, so as to prevent the water getting into the inside of the house.

Fig. 37 shows a bearer nailed against the side of the rafters, and upon this bearer, and also upon the rafters, boards are nailed down,



upon which boards the lead is laid, reaching up to and covering over the tilting fillet, so that when the slates are nailed down, projecting, say, 2in. or 2½in. beyond the tilting fillet, the water from the roof is thrown well into the lead of the valley, without any risk of the wind driving it back under the slates.

For economy's sake, the gutter bearers could be of the same thickness of the rafters, and nailed on the rafters instead of against the sides; this method is shown in Fig. 38. Should the method shown in Fig. 37 of putting in the gutter bearers be adopted, the bearers would be checked out half their thickness, leaving on the portion which would rest upon the rafters. This method is very much firmer, as it ties the two sets of rafters together; but in such a case, as is shown in Fig. 38, it is not so necessary, except at a drip, which is shown in elevation by dotted lines in Fig. 37. A section through a drip being shown in Figs. 39 and 40,

FIG 39.

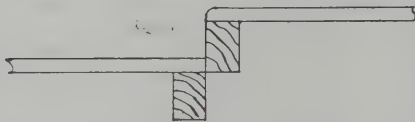


Fig. 37 shows the valley-boards laid on and mitred at the junction of their edges; that is, however, going to an extreme, as they are frequently only brought together with square edges, as seen in Fig. 38, forming a close joint on the top side.

Gutters, in addition to having drips about every 10ft., must also have a fall of about an inch in that length. In order to give this fall the gutter bearer nearest the outflow or cesspool into which the water from the valley is to flow is nailed on first, according to the breadth required; 5in. or 6in. is ample unless the valley is a very long one, and even in that case it is better, if possible, to let the water flow to opposite ends, or else have the cesspool in the centre. Next, level 10ft. along, and at this distance rise an inch; at this rise put in another gutter bearer to suit. Now fasten two lines (chalk lines) to these bearers, one at each end of each bearer, pulling them tight; now put in the intermediate bearers (one at each rafter) to these lines. A straight-edge could be used instead of lines; but the lines are most convenient except for a very short gutter. Of course, this does not apply to valleys formed by the depression between two roofs, which depression is inclined to the horizon at nearly the pitch of the roof, as then the valley boards are brought together edge to edge, and nailed to the jack rafters (creepers).

Let it be observed that no sharp edges are to be left, as these would cut the lead: a shaving or two off the sharp arris with the jack-plane or chisel will be enough.

Fig. 39 shows a drip. This helps to speed the flow of the water and prevent a backwash

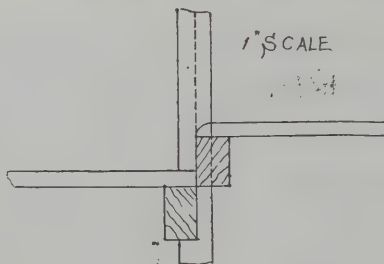


FIG. 40

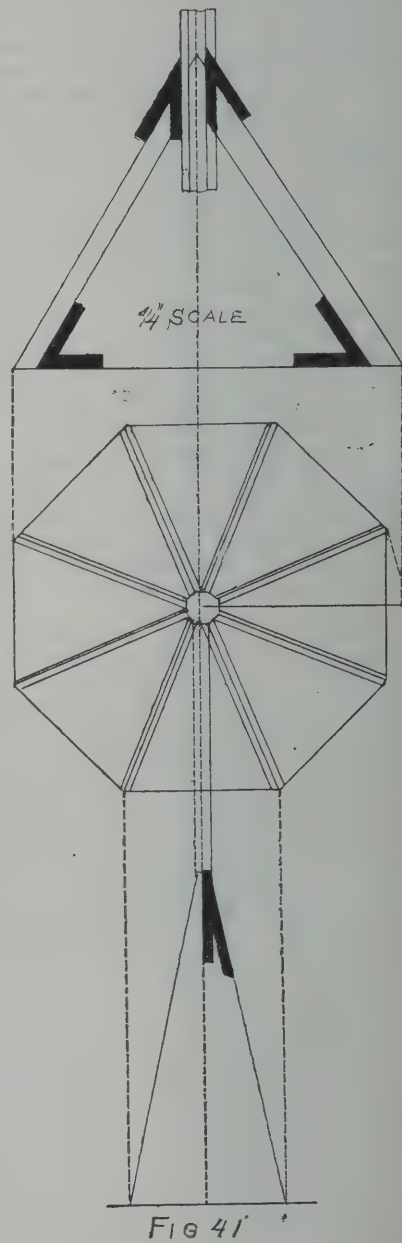
along the full length of the gutter. Fig. 40 shows the rafter and the gutter bearers, half-checked and nailed against it from opposite sides; 2½in. or 3in. is sufficient in nearly every case.

It will be noted that the fall in the gutter makes it wider at the end farthest from the outflow. It is necessary, where great security is required, to rebate a little out of the upper gutter-board just at the drip to allow of the lead, which is laid on the bottom gutter-board, turning up the drip and being nailed into this rebate, the lead of the top gutter reaching down nearly to the under gutter; but as the plumber is usually about at such a time, he will, if asked, say what preparation he wants.

Fig. 41 shows a plan and elevation of an octagonal roof, as also one of the triangular sides of the roof, in order to show how the bevel of jack-rafters is obtained. The plan of

the octagon shows the outer line of wall-plate (this wall-plate would be half-checked and nailed together at the angles) and the plan of each hip-rafter, also the plan of centre-post against which the hip-rafters would be spiked.

The right-hand side of plan and elevation (Fig. 41) shows how the lengths of hip-rafters are obtained. Swing round upon the centre of octagon as a pivot the plan of one of the hip-rafters until it reaches the middle of a side; then square up to the base-line of elevation, and join this with the point where one of the common rafters would terminate at the top; the bottom level of hip-rafter is shown inside, so as not to confuse the reader as to where the projector from the plan intersects the



base-line of the elevation; on the left-hand side of the elevation is seen a common rafter; the projector, as is seen, is drawn from the side, and, as before stated, the hip and common rafters continued would have a common apex (meeting point). The plans of jack-rafters are not seen in the plan, in order to avoid confusion; but there would be, in this case, two jack-rafters between each pair of hip-rafters, which would be 12in. from centre to centre, and also to centre of hip-rafter. No attempt is made to show how the centre-post would be finished. It might be turned above where the lead would be nailed against it, a rebate being made for lead round the post in such a case, so as not to interrupt, by its projection, the course of the water flowing down; or it might be wrought octagonal, or a cast or wrought-iron finial might be placed upon it, a bolt passing down through its centre, with a washer and nut



to keep all secure. Beneath the plan of octagon is seen one of the triangular sides of the roof; its base is equal to one side of the plan of octagon (wall-plate); its height is equal to the length that would be required for a common rafter if placed in the centre of this side, the two equal sides being the centre lines of the hip-rafter. The raking level is seen of the jack-rafters; the top and bottom cuts are shown on the left-hand side of the elevation of the roof.

A method of setting-out an octagon which may not be generally known is: Having, say, a square post which is to be made octagonal, draw diagonals to the opposite corners; where

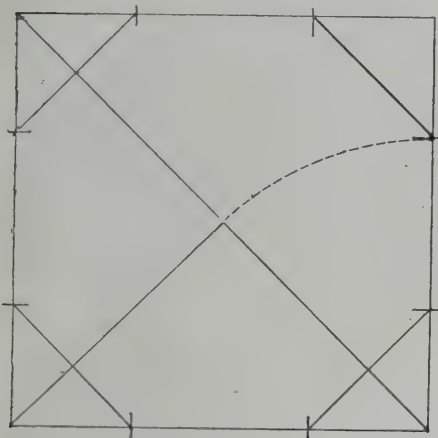


FIG 42

these intersect, of course, gives half the diagonal, which, taken from the breadth of one side of the post, leaves for a remainder what has to be taken off. Draw gauge-lines at this distance from each corner on each face of the post, and work it off to these gauge-lines. This is clearly shown in Fig. 42.

Fig. 43 shows the way to arrange the sill of

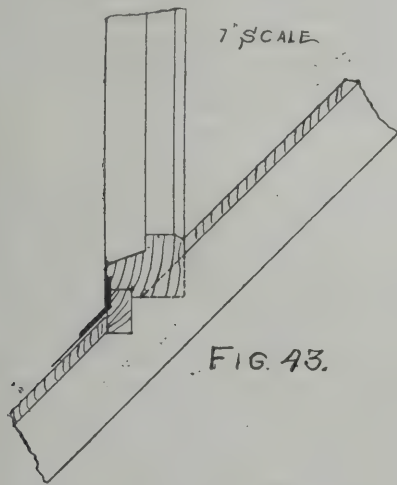


FIG 43.

a dormer window on a roof. Cut a triangular piece out of the joggle of sill, as shown by dotted lines, so as to fit the pitch of the roof, and spike sill down to the rafter. It would be better to have a strong rafter under each joggle of sill to bear up the weight of dormer frame. The under side of sill is shown rebated in front to prepare for the piece as seen, in order to make a lighter sill do. It will be seen that the front face of sill is rebated to provide for the lead being carried up and nailed against it, shown by the dark line. The finishing of dormer inside will be treated of with other internal finishing. The roofing of dormer is done by laying a wall plate on the joggles of head of dormer frame, and continuing them along on the level to the rafters of the main roof, which bear up the joggles of sill (joggles are the ends of sill or head which project beyond the upright pieces or stiles), the ridge of dormer roof would, of course, be continued in, level to the intersection with the main roof.

Frequently the jack rafters (creepers) of the dormer roof at bottom, rest upon a piece nailed upon the common rafters of the main roof; the outer edge of this piece being a line drawn from the intersection of dormer wall plate with main roof as one point, and the intersection of ridge with the main roof as the other, which would make the jack rafters fill a straight edge laid along the common rafters of dormer roof.

Fig. 44 shows the method of fixing a barge-board. The end of the ridge is tenoned to

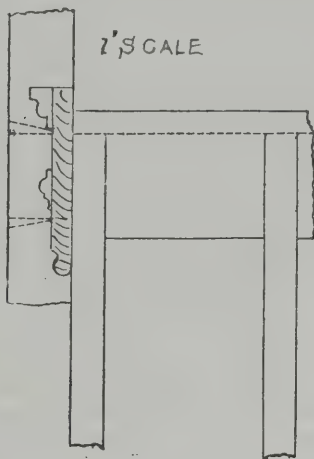


FIG 44

receive finial (hip-knob), which is of wood, and would be mortised to receive end of ridge. The finial would also be mortised to allow of tenons on the upper ends of barge boards passing into it. The barge board is nailed to the rafter down along its length, and receives additional support from the purlin or purlins, which are continued through the wall and wrought in the form of a bracket or cantilever.

The underside (soffit) of rafters, which are beyond the wall, is usually sheathed or panelled, as also the soffit of rafter ends projecting beyond the wall in front or rear, as shown in Fig. 20. A barge board usually occurs in a dormer roof.

Barge boards are of almost infinite variety of design, and are a prominent feature of cottage architecture.

It will be readily seen how all that occurs in this article applies to the "Illustrations of Papers on Practical Architecture," which have appeared in the BUILDING NEWS lately.

#### STRAINS.—VIII.\*

By G. A. T. MIDDLETON.

#### COLUMNS AND STRUTS.

THE following paragraphs have reference to, and should have appeared with, Figs. 53 to 62, which were given last week:—

Columns and struts vary in their bearing capacity, not only with their sectional area, but also greatly with their length. This variation does not depend upon mechanical principles, and it has only been possible to arrive at a formula which will give an approximately accurate result after much patient investigation of the results of a long series of experiments. Several such formulæ have been put forward from time to time, but all depend upon certain definite hypotheses. The one given here is not that which is best known, but it is easy of application, and is as correct as any. It is for columns of less than thirty diameters in length, and is based upon the following assumptions—viz., (1) the ends must be planed or turned so that their surfaces will be perpendicular to the axis of the pillar; (2) the bases and caps must be planed or turned to fit the ends; (3) the pillars must be set with the axes vertical and directly under the centre of the load.

Where these rules cannot be complied with, as in the struts of a roof truss, a slight modification of the formula is necessary. Under ordinary circumstances, however, where the

rules apply, the breaking weight in tons has been found to be

$$FK \left( 1 + C \frac{l^2}{k^2} \right)$$

when K = breaking weight of the material in tons per square inch, as ascertained in the usual way by crushing solid cylinders whose length is equal to twice their diameter; in other words, K = 36 tons for cast iron and 16 tons for wrought iron, F = sectional area of metal, l = length in inches, C = 1-6,400ths for cast iron and 1-36,000ths for wrought iron. Where one end is jointed or bears unevenly use 2C instead of C, and where both ends are jointed use 3C.

If it be required to ascertain the weight which the column will bear safely, the value of K must be the "safe load" of the material per square inch, or quarter the breaking weight in quiescent structures, and one-eighth the breaking weight in structures subject to a moving load.

It is more often requisite to discover the necessary sectional area for a column which has to carry a given load than to find out the bearing capability of a given column. In this case W, the load which it will be necessary for the columns to carry safely, is known; K must be taken as the "safe load" of the material per square inch, and the formula must read—

$$F = W \left( 1 + C \frac{l^2}{k^2} \right) \div KW$$

#### ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

**BIRMINGHAM ARCHITECTURAL ASSOCIATION.**—The present session was opened on Wednesday last by a conversazione held in the Edgbaston Assembly Rooms, at which about 300 members and friends were present. The proceedings were commenced with a reception by the president and committee, after which a few selections of instrumental music were given. In the drawing-rooms were arranged a large collection of sketches and photographs. Dancing was begun at 9 p.m., and was carried on to the small hours of the morning.

**LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.**—The opening address of the 13th session of this society was delivered on Monday evening by the President, Mr. Henry Perkin. Dealing first with the proposed federation of provincial societies with the R.I.B.A., he declared that membership of the Institute could not be regarded as a sufficient guarantee to the public of an architect's efficiency, and that compulsory examinations for membership would not meet the case. With a diploma to practise, the two chief disabilities might be met. Passing on to consider the competition question, the president remarked that the problem was to reduce the work of expenditure in competitions. This might be done by limiting the selection to architects known to be more or less qualified for the work. In limited competitions the money offered as premiums should be equally divided amongst the unsuccessful competitors, and the execution of the work intrusted to the author of the selected design. In public open competitions the premiums should be of equal value, and more numerous than the first, second, and third prizes generally offered.

**MANCHESTER SOCIETY OF ARCHITECTS.**—In the students' competition for the current year the president's prize of five guineas has been awarded to Mr. Stanley Davenport Adshead, who is engaged in the office of Mr. Medland Taylor. For the other prizes, amounting to fifteen guineas, there were no competitors. There seems either little zeal or much diffidence among the juvenile members of the profession in Cottonopolis. The annual dinner of the M.S.A. took place on the 8th inst., Mr. Waterhouse being among the guests.

Mr. T. W. Aldwinckle, F.R.I.B.A., will shortly bring out a fully-illustrated book on "Workhouse and Parochial Buildings." The bulk of the plates are to be devoted to plans, and some views will be given of some important buildings of this class erected by the author. These are from the pen of Mr. Maurice B. Adams.



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## ILLUSTRATIONS.

WARWICK CASTLE.—DESIGN FOR THE NEW FACADE OF  
MILAN CATHEDRAL.—THE FLEMISH ROOMS IN THE  
TIVOLI RESTAURANT.—HOUSE AT BEXHILL, SUSSEX.  
—AT THE SALE ROOMS.—CHURCH FURNITURE.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## CÆSAR'S TOWER, WARWICK CASTLE.

WARWICK Castle, standing on the site of the older fortress built by Ethelfleda, and which was added to by Turchil for William I., affords a strongly marked mixture of civil comfort and military strength; not only capable of sufficient resistance to sudden attack of marauders, but amply roomy and convenient enough in its internal arrangements for the hospitable entertainment of the noble owner, containing—

"An halle for a high kynge, an household to holden,  
With brod bordes abouten ybenched wel clene;  
With wyndowes of glas wroughte as a chërche."

The buildings thus illustrate in a remarkable degree the change from the castle type proper to that of the dwelling house, the development from the stern necessities of a feudal fortress to the refined requirements of a ducal mansion. Archaeologists have long loved to seek traces of the Norman Castle here, but these are now scarcely to be found. It seems to have stood well cared for during 200 years; but in 1256 (Henry III.) the building was besieged and taken, and a great part of it destroyed. In this condition it lay until the time of Thomas Beauchamp, Earl of Warwick, who died in 1369, and who rebuilt it. He was no uncommon soldier, having fought in the Holy Land, led the van at Crecy, engaged in the siege of Calais, and distinguished himself at Poitiers. It is not surprising, therefore, that his military buildings were exceptionally well contrived, and he it was who built the noble tower, called "Cæsar's Tower" from its magnitude. Springing from a bold escarpment of rock, its base is washed by a wide and unfordable river, bidding defiance to the miner, while its summit is crowned by a boldly-projecting machicolated parapet, from the battlements of which, protected in the openings by wooden bretèches, the defenders were able to fire on their enemies or hurl missiles down upon them. These discharges falling against the sloping or battered base of the tower rebounded off at such an angle as to strike the breasts of those engaged in the attack. Each merlon of the topmost story is pierced with a cross loophole so as to be available for the long or cross bow, and has the lower edge sloped at exactly the angle required to clear the projecting gallery beneath. The loopholes of the embrasures are so placed as to command, too, the most useful points of defence. The battlements of the alure were roofed over, and the holes for the supports of the timberings are still visible in the walls, and in some instances marks of the mantlets are to be noted. The plan of Cæsar's Tower is that of three segments of a circle, with very thick walls, and it remains almost entirely in its original state, as perfect, in fact, as when it was first built, and therefore is one of the most valuable English specimens of ancient military architecture in the kingdom. Our two photographic views given herewith to-day in illustration of these notes are from

two admirable silver prints by Messrs. Poulton and Son, of Lee, Kent. Guy's Tower was built and finished in the 17th year of Richard II. (1394) by Thomas Beauchamp, son of the above-named Crusader, and he also rebuilt Warwick Church, of which the chancel still remains. George Plantagenet, Duke of Clarence, resided in the castle in the reign of Edward IV., and added to the buildings, erecting the gateway on the north side. Nothing more of any consequence was done till the reign of James I., when that monarch granted to Sir Fulke Greville the castle and estates. It was then used as a county gaol, and was in a ruinous condition. He spent large sums of money on the repairs and additions, and to this period must be referred, amongst other portions, the buildings at the east and west ends of the main structure. Subsequent additions have been made, particularly the extension of the porch, and the erection of a dining-room in front of the hall, and also of offices outside the wall adjoining the barbican. The late Mr. Salvin restored the residential portion of the castle as we now see it, subsequent to the disastrous fire some years ago. An engraving of Guy's Tower, with a section and plans, is published in the second volume of Pugin's "Examples," and a plan of the castle will be found in Parker's "Domestic Architecture of the Middle Ages," Vol. III. page 5. There is a good view of Cæsar's Tower, with another general view of the castle, in Britton's "Architectural Antiquities," Vol. IV. Mr. Geo. T. Robinson, F.R.H.S., read an interesting paper on "Warwick, Kenilworth, and Maxtoke Castles" before the Kenilworth Institute, Oct. 25th, 1859, which was published in a pamphlet form by Simpkin, Marshall, and Co. in that year.

## MILAN CATHEDRAL COMPETITION: THE ENGLISH PREMIATED DESIGN.

THE following notes descriptive of this design, which we illustrate to-day, are taken from Mr. Daniel Brade's report. He is the only English architect whose design was chosen for the second contest just decided, and in which he has been awarded one of the premiums for his scheme. We give a general view from the original drawing now at Milan, and a detail of the principal portals. "I have not made any notable variation from my former design, the main feature of which has been adhered to. I have avoided anything like an attempt to rival or balance the present central tower and spire. The two angle towers are placed with a view to accentuate the new façade and connect same with the flanks. The proportionately moderate height is adopted to prevent any idea of overgrowth or strained effect. The same remark applies to the central gable, which, having no roof behind it, should not be carried to an extravagant height above the terrace flat. To the smaller gables over side aisles I have somewhat altered the design, so as to better correspond with the existing work; other lesser variations are now made with the same object. To follow too closely the style and detail of the present architecture would be to repeat and perpetuate the very errors we are now engaged in rectifying, for whatever may be the excellence and merits of the existing Duomo, it cannot be conceded that purity of architectural detail or repose and proportion of ornamentation are among them. Take from the existing façade the Renaissance doors and windows, and these would result in a façade harmonising as well, or better than, anything we can now propose. The present Renaissance features, such as the doors and windows, balconies, bassi-rilievi, &c., I propose to place in a distinct structure, as shown on my plan, on the south-west side of the duomo in the open piazza. I would utilise this as an inclosed memorial fountain and shelter room, to be adorned with statuary and carving. Some other of the present bassi rilievi and all the statues, and part of the ornamentation would be re-used in the new façade and the return flanks. One or other of the new flanking towers I propose to utilise as a belfry campanile for twelve or ten bells and ringing chamber below. I have provided access by ample stairs to all the several stages and terraces of the old and new parts, as also to the new west loggia and balconies. Further, I have contrived a triforium gallery to the new west wall inside, which will also communicate with the open loggia and balconies

outside. As to other matters, I may repeat what was stated in my former report. The façade will be constructed in similar marble to the present Duomo, some darker courses in the towers being in black-banded or red marble. The columns to the arcades and porches inside and outside may with advantage be in variegated marbles. The large, circular panels in main gable it is proposed to adorn with the effigy of St. Ambrose; to the spandrels below would be similar alti-rilievi of St. Carlo Borromeo and St. Athanasius. The smaller gablets to the external arcades or loggias have enriched Gothic foliage, and a ground on inlay of parti-coloured marbles, also to the spandrels of the arcading."

## THE FLEMISH ROOMS AT THE TIVOLI RESTAURANT.

IN connection with the Tivoli Restaurant now being erected in the Strand, which we illustrated in our number of the 2nd inst., we publish in this week's issue views showing the two ends of the Flemish room, one of the large dining-halls of the building. The decoration is in oak, of which the carving has been carried out by M. Goyer, sculptor, of Louvain; and the entire decoration of this room, as well as the rest of the building, is being executed by Messrs. Heighway, Kusel, and Depra. Mr. Walter Emden, of 105-106, Strand, W.C., is the architect.

## HOUSE AT BEXHILL, SUSSEX.

THIS residence, lately completed, has been erected for the architect, Mr. J. B. Wall, A.R.I.B.A., of 32, Walbrook, who is also surveyor to the Egerton Park Estate, upon which the house has been built. The position being close to the front parade, the oriel window is placed at the angle of the principal rooms commanding the most extensive sea view; the arrangement of plan is somewhat varied from the usual course by making the floors of the front and back rooms of different levels, thereby avoiding passages and obtaining a compact dwelling on a limited site. The hall and principal landing is paved with marble mosaic, with vein marble steps and risers; the basement floor is laid with Lowe's wood-block flooring; the windows in hall and staircase are filled with stained glass. The house is faced externally with red brick, with local sandstone random course base, the roof covered with Aylesford tiles, all woodwork externally being finished cream white. Three additional rooms are obtained on upper floor.

## AT THE SALE ROOMS.

OUR sheet of sketches is taken from some very good furniture that was sold at No. 4, Tilney-street, Park-lane, W. The old French Marqueterie Commode was beautifully inlaid, and the ormolu mountings were well chased. It had a shaped front, and a rare slab of marble surmounted all. The little tulip-wood Cabinet Table had a revolving front, inside which were four drawers. The ormolu mountings were also very good. It was inlaid with ebony, king-wood, satin-wood, &c. The Antique Commode also shown was about as fine an example of this class of work as we remember to have seen, and the delicate workmanship, whether of the inlay or the ormolu, at once commanded admiration. The Louis Armchair was part of a suite, gilt frames, covered in flowered brocade. The other was an English 18th-century Chair. There were many other good things in this sale which space would not permit our illustrating.

A transept is being added to St. Thomas's Church, Southborough, near Tunbridge Wells, from designs by Mr. Garling. Mr. Gallard, of Southborough, is the builder, and reopening services will take place next week.

The Lord Mayor opened, on Wednesday week, the new fish market, which has been erected by the Corporation on Snow-hill. The market, which was designed by the late Sir Horace Jones, occupies a space of 14,000sq.ft., and has cost about £25,000. The style is Italian Renaissance. It has a granite base with Portland pilasters, surmounted by cornice, pilasters, and dormers of Portland stone, the remainder of the walling being of red brickwork. The work has been carried out by Mr. Mark Gentry.



## WAYSIDE NOTES.

THE Interim Report of the Royal Commissioners appointed to inquire into the irregularities in connection with the working of the Metropolitan Board of Works does not seem to have been altogether what was anticipated in many quarters. The major part of the London daily press has certainly not been satisfied with the tone of the report. That mighty agent evidently expected a more liberal serving out of peppery condiments—a more sweepingly condemnatory denunciation of the happy family at Spring-gardens, now about to be broken up for good—or bad. And, in truth, the comments of the Commissioners are well tempered with mercy, and the parties concerned in the “irregularities” may congratulate themselves not a little on this account. Still, the report has served its purpose: it has shown conclusively the amount of jobbery and corruption that existed for a long period at the Board of Works, although it is altogether within the bounds of possibility that the Commissioners did not find out but a tithe of what has existed in the past. But the ferreting out of further misdeeds would have served little practical purpose, so it would appear to me that the Interim Report is as satisfactory as could be. Perhaps it would have been as well if it had set forth a few suggestions as to the prevention of corruption in any future municipal governing bodies other than the one hinting at making it penal to bribe or to accept a bribe, which it is to be hoped, however, will be made law. Such measures ought to be taken at once, so as to prevent the possibility of similar “irregularities” in the future eating their way into the heart of the new governing bodies so soon to be set up in the country. For, according to all accounts, it is the identical class of corruption that was rife at Spring-gardens that is to be feared in the future County Councils. Should such fears prove to be well grounded, may the peccant members and officials belong to any other profession than that of architecture!

We have yet to see how the County Councils will work. There appears to be more than a touch of vestryism and Bumbleism about the scheme. But this aspect of the question does not affect us, as, from our point of view, all that is of importance is that the machinery to be provided for the inspection and passing of plans and the management of municipal works and improvements may be efficient, impartial, and expeditious. That this machinery will have its weak points we well know. One cannot but regret that at the commencement of a new era in local government—a sort of municipal new-leaf-turning-over—the future officials charged with the inspection of works, under the supervision of provincial councils, should not have been such as have passed a stringent examination, proving them to be at least a match for Mr. Buggins and his relations. Mr. Waterhouse touched upon this point in his late address at the Institute—a point to which, it will be remembered, he, on behalf of the Institute, called the attention of the Government some months back. The Government ignored the question, because, it may be, of the haste with which the new scheme has been prepared, the Local Government Bill having certainly been passed through the Houses with a business-like despatch wholly unparliamentary. Whatever may have been the cause of this lamentable neglect of a most important detail in the new arrangements for local government of the future, we have now to face the fact that the provincial relatives of Mr. B. will in many cases be able to wage war with their natural enemies, with some advantage to themselves. Let us sincerely hope, then, that as Mr. Waterhouse said, if in the future the Act comes to be further amended and enlarged—as is contemplated—this serious defect in the organisation of the county Councils may be remedied.

The accident at Great Titchfield-street, Oxford-street, seems to have been wonderfully little noticed in the daily papers. Yet surely there ought to be some explanation forthcoming of a wholesale collapse of a new building in the heart of London, particularly when we consider that no less than four persons were killed outright, and seventeen more or less injured! It is to be hoped that you will give us

some explanation, or, at least, further information on this subject, this week. If I am right in my conjecture, this is just such an accident as one daily expects—viz., the failure of the iron skeleton and consequent precipitation of the tissue of bricks and mortar. But where was the failure, and why did it occur? I feel sure your readers, while trusting that it may fortunately happen that there is no one to blame, will look for some detailed account of this disaster, which should be instructive.

A communication to the *Times*, some days ago, gives some explanation of the cause of the wretched appearance of the church of St. Mary-le Strand, to which I recently referred. Lack of funds is urged as the excuse. The want of something is certainly felt about the skyline of the building. Of all the miserable effects of a dilapidated piece of architecture, commend me to that of the west front of this church, about the region of the parapet. Balusters and rails have disappeared some time since from the coping abutting on the north side of the tower. On a gloomy, foggy morning the sight of this lop-sided arrangement is most depressing. Do, someone, subscribe a few pounds to have this balustrading made symmetrical.

Great preparations have been made at Windsor Castle for the reception of the Jubilee gifts presented to the Queen. The grand vestibule is being fitted up with most elaborately carved oak show-cases, crimson-lined, and withal in the Gothic style of architecture. The “noses” of all the other articles which in by-gone times were exhibited to those visiting the Royal suite of apartments have doubtless been much put out of joint. As a matter of fact, they have been removed to make way for the new treasures, excepting, however, the white marble statue of the Queen, which is retained on the north wall of the grand vestibule, and will, moreover, be enhanced with the addition of a sheltering carved oak canopy. On either side of the Royal state will range the show-cases for the Jubilee gifts, and what is described as a “beautifully designed Gothic fireplace” is also being constructed in the apartment. We shall therefore have some excuse for rambling out Windsor way again. A few Gothic show-cases, I contend, is quite sufficient excuse to attract us to a pleasing district, for a visit to the castle and the beautiful chapel, and the old Etonian Collegiate architecture, even at this time of the year;—although November is not exactly the month to wander among the leafy glades of the home park or across the meads that border upon old Father Thames. Besides, there must be many like the Ancient and Venerable, who never went to see the Jubilee presents at St. James's Palace. Perhaps one was well out of the crush, which I understand was considerable, even reminding one of an A.A. *post-soirée* rush for headgear, &c.

“Elizabeth and Victoria” seem to have been more entertaining than instructive, though I do not mean by this anything in disparagement of Mr. Gotch's interesting paper. And it was fitting that somebody should dwell upon the merits and shortcomings of the Elizabethan style and trot it out a bit, as we have drawn largely enough from it for inspiration, in the past few years. I would commend Mr. Gotch's concluding remarks to the notice of the architectural sketcher, or, rather, to the architect who sketches, as nowadays there is a large army of draughtsmen who draw architecture only for the sake of the picture. To these it little matters what may be the quality of the architecture sketched. But to the persons who draw for inspiration it matters very much indeed, and they should therefore make a study of how to cull the good and reject the bad features of the style, as Mr. Gotch advised in the matter of Elizabethan, although, perhaps, by this he referred as much to plan as to elevation. This is excellent advice; we all advocate it, but how few follow it may be seen by noticing how invariably an architect designing in a style rather strange to him will adopt barbarous forms and features simply because they existed in the original work, and he has not had the courage to boldly discard them. More than this, we know how general it is, when one would imitate style—

in design, drawing, or the mode and manner of anything—to copy the faults and miss the good points. To avoid falling into errors of this description, there is only one safeguard, and that is the study of first principles of architectural beauty. I repeat, what I have often before urged, that we need far more writing and thinking about—far more lecturing on (by really capable men) the ethics of the beautiful in architecture.

The Carleton School Board competition instructions almost take one's breath away. I can only stigmatise them as a piece of gross impertinence. *Specifications and detailed bills of quantities* for the £20 premium! Great (Sir Gilbert) Scott. The way, too, in which the instructions are worded is simply impudent. Many are worded like the directions given in a school boy's examination paper. All should procure these instructions—as a curiosity; but I hope and trust none will condescend to compete, excepting those for whom the competition is intended—ambitious office boys and one-year-old pupils.

The opening *Conversazione* of the Society of Architects at the “Arts and Crafts” on Tuesday, was a decided success. Good music, the nicest of pretty things to look at all round, admirable arrangements as regards refreshments and the cloak rooms, and no crush anywhere, but a pleasant company of gracious ladies and reasonably contented men enjoying the evening. The president mercifully shortened his address, and Lord Winchelsea kept his remarks well within the bounds of fitness and moderation, so that the company were not plagued with undue speech making. A well-marked cheer—accompanied by a sarcastic laugh here and there—greeted the President's announcement that no member of *this* Society had been found guilty of unprofessional conduct in connection with the Metropolitan Board of Works scandals. Many, outside the profession as well as in, were evidently glad to know that so far only one Society had had to drum a member for unprofessional conduct, and that that society was *not* the Society of Architects. GOTH.

## CHURCH FURNITURE.

WE illustrate to-day some further examples of carved oak-work executed by Messrs. Luscombe and Son, sculptors, &c., of Exeter.

The Altar for Ugborough Church, Devon, designed by Mr. R. Medley Fulford, A.R.I.B.A., Exeter, is well executed; the Agnes Dei panel being carved in bold relief, with a background of gilded diaper work.

The Screen to Tower, Barryharbour Church, Devon, designed by Mr. J. Buckley Wilson, F.R.I.B.A., Swansea—also in oak—is surmounted by the arms and crest of the Basset family. A Screen to the vestry has also been executed from designs by the same architect.

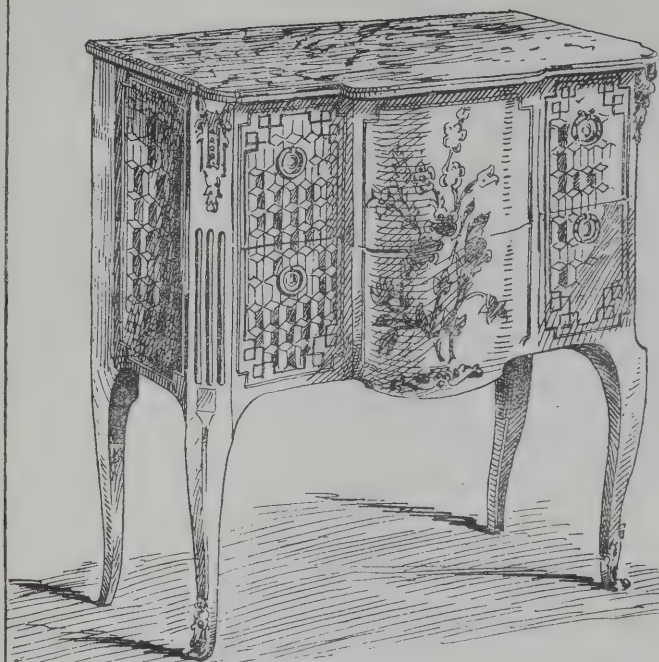
The Presses for altar frontals and altar furniture for Monkton Wyld Church, Dorset, designed by Mr. F. C. Eden, of Kensington, and executed at the expense of the rector, the Rev. J. B. M. Camm. The Frontal Press is of oak, lined with cedar, having massive ornamental wrought-iron hinges. The Furniture Press is also of oak; the hinges, lock-plates, handles, &c., being of wrought steel, highly burnished.

Mr. David McGibbon, architect, is about to publish an historical sketch of the architecture of Provence and the Riviera, with illustrations of the various styles of building which have prevailed there from the earliest times. The drawings are to number 800, and will include sketches of Roman temples, aqueducts, &c.; also examples of Christian architecture, showing the transition from Roman to Mediæval types, as well as specimens of the Ecclesiastical and castellated work of the Middle Ages. The fortified churches of the South of France will form a feature, in which the monasteries of the district will be shown.

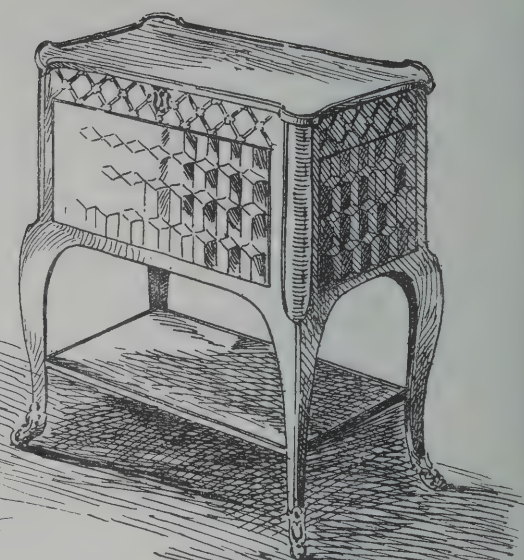
The death is announced from Merthyr Tydfil of Mr. Samuel Harpur, who for a quarter of a century, down to June, 1836, served the local board of that town as their surveyor and engineer.

The medical officer of health for Manchester (Mr. John Leigh) died on Sunday at his residence near Bowdon. He had held the office from the time of its creation in 1868.

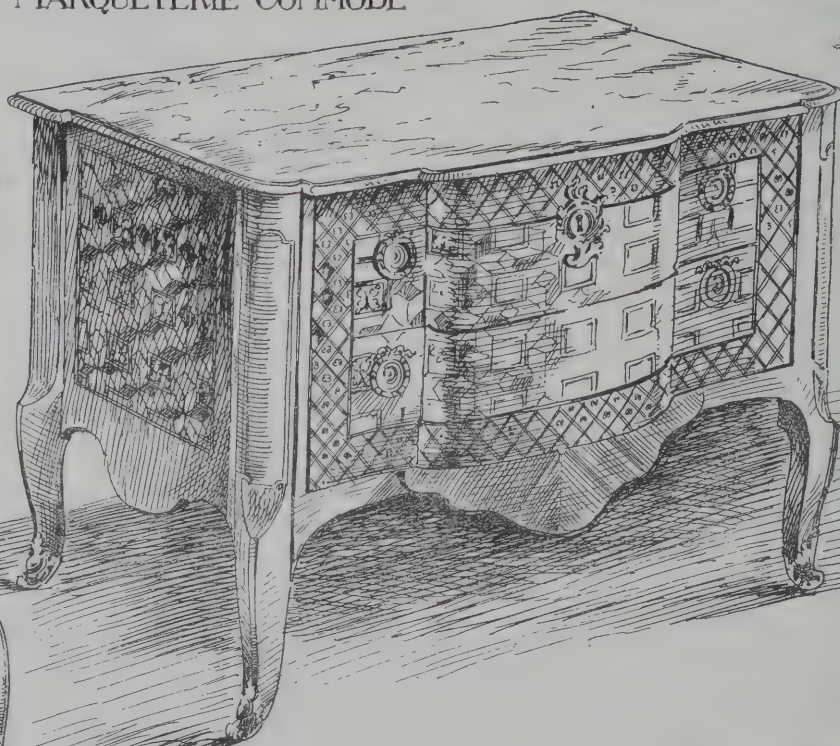




ANTIQUE · MARQUETERIE · COMMODE

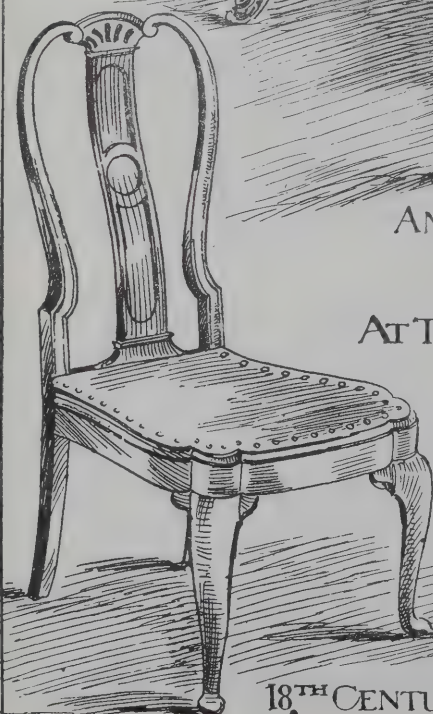


TULIP · WOOD · CABINET · TABLE



ANTIQUE · COMMODE

AT THE SALE · ROOMS

18<sup>TH</sup> CENTURY · CHAIR

LOUIS XVIII ARM · CHAIR















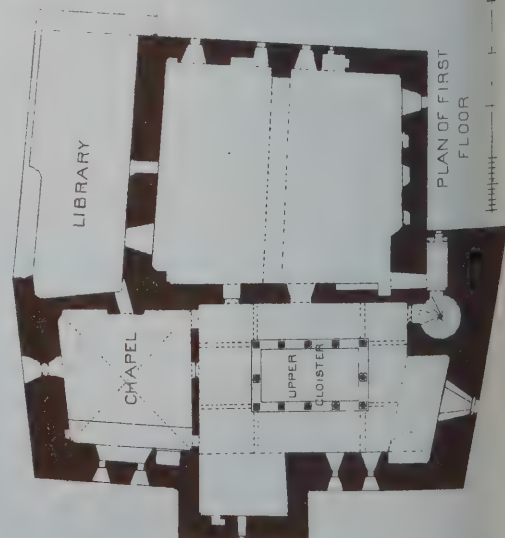
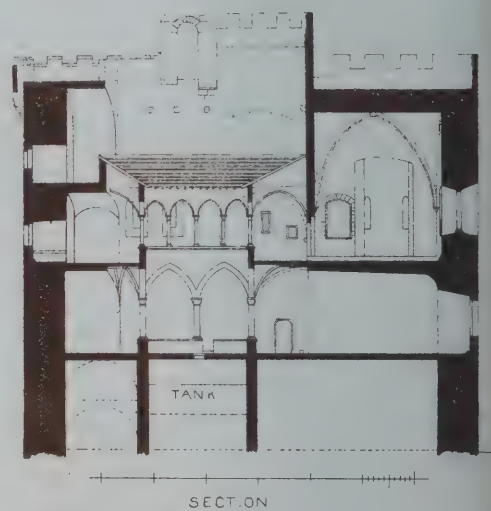
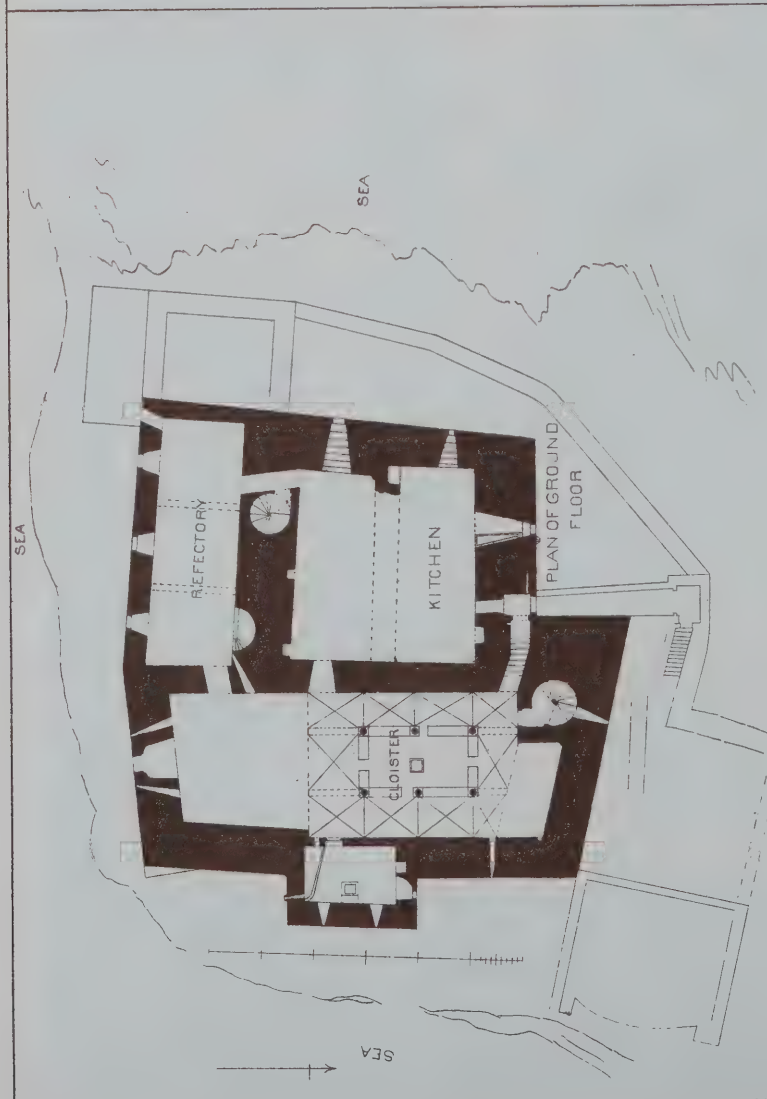


PHOTOGRAPHED BY POULTON & SON.







CASTLE OF ST HONORAT · PROVENCE · DRAWN · BY · DAVID · M<sup>C</sup> GIBBON







MILAN CATHEDRAL COMPETITION.

THE PREMIATED ENGLISH DESIGN.



. LA NUOVA FACCIATA DEL DUOMO



Nov. 16. 1833.



MILANO.

DANIEL BRADE (FRIBA)  
ARCHITETTO.  
KENDAL. INGHILTERRA.

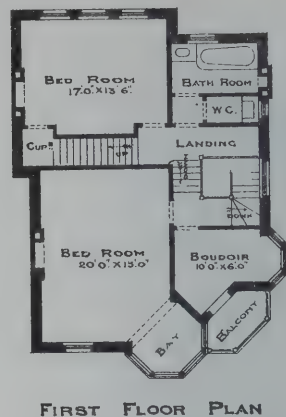
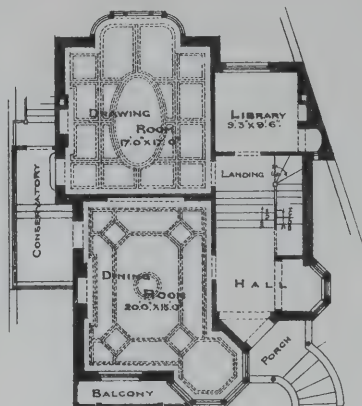
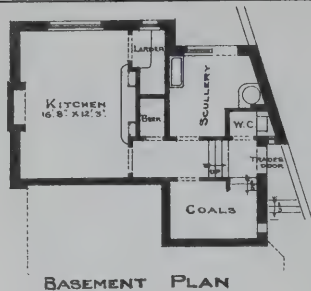














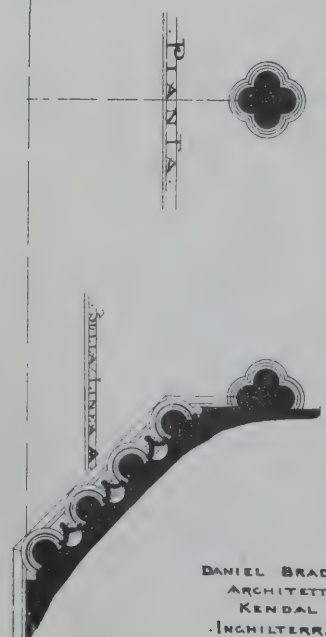
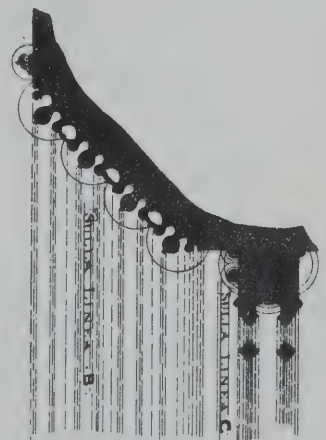
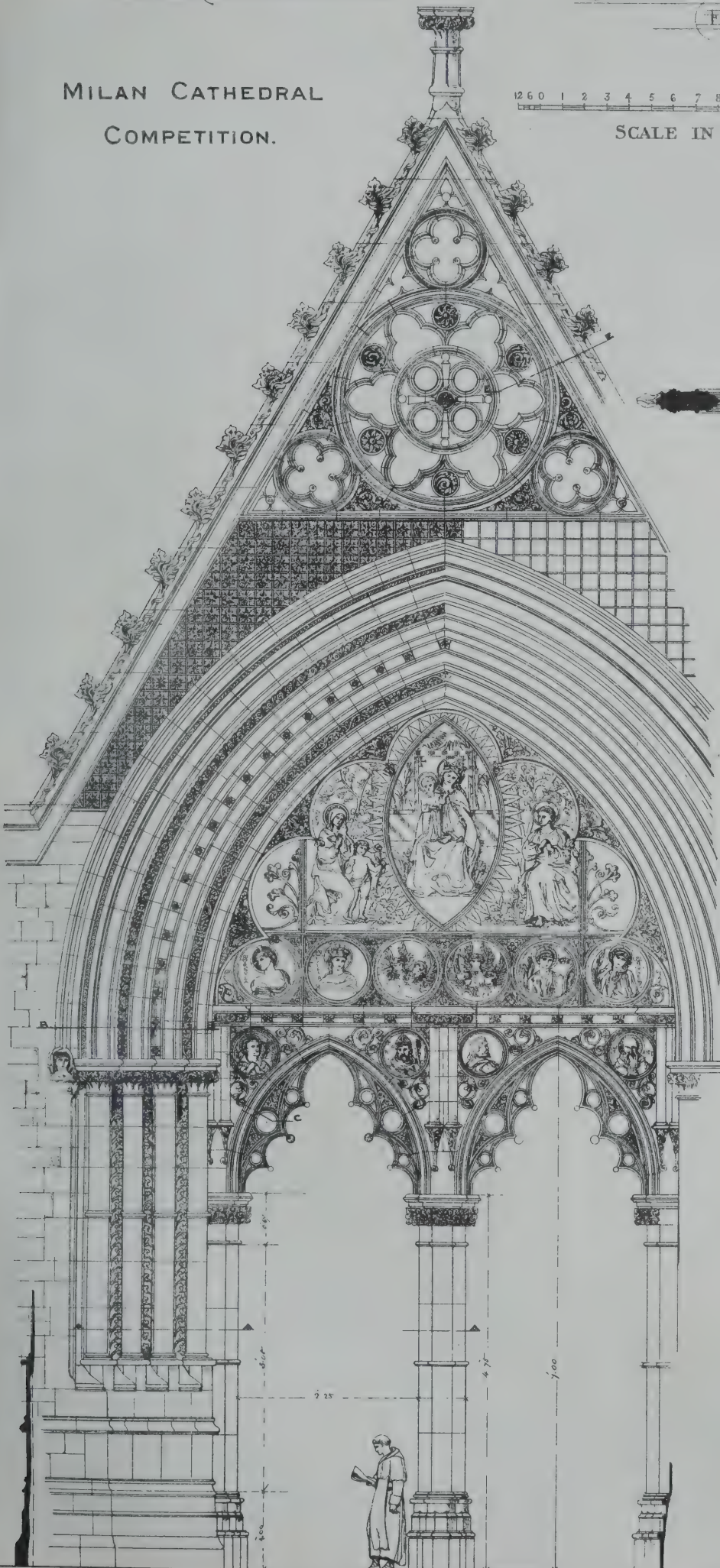
LA NUOVA FACCIATA DEL DUOMO  
DI MILANO.

DETTAGLIO DELLA GRAN PORTA  
(ESTERNA)

MILAN CATHEDRAL  
COMPETITION.

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SCALE IN ENGLISH FEET

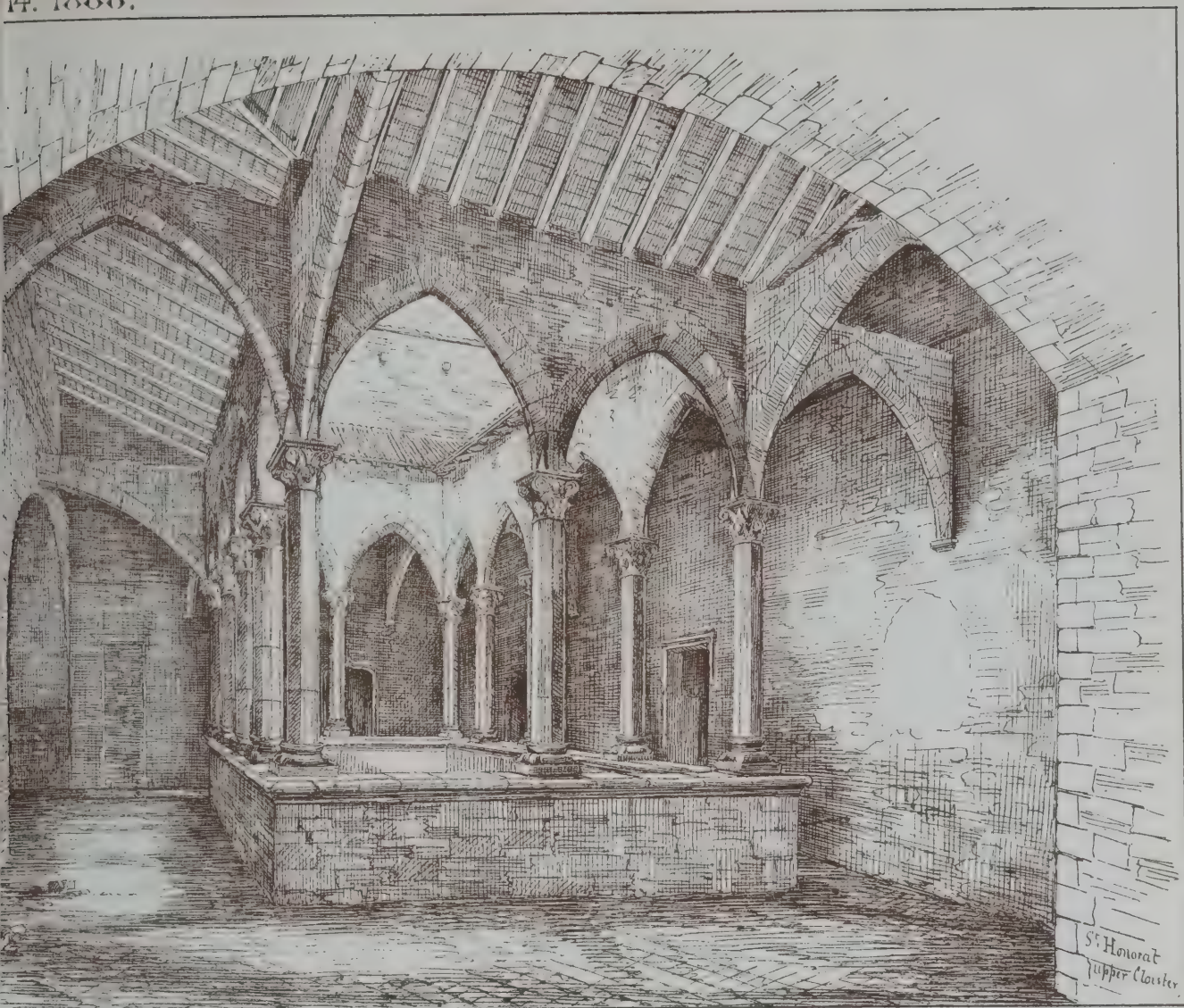


DANIEL BRADÉ  
ARCHITETTO  
KENDAL  
INGHILTERRA

























WALTER EMDEN Architect.  
nos 9 106 Strand W.C.  
GOYERS FINE SCULPTOR, LOUVAIN

THE FLEMISH ROOMS: THE TIVOLI, STRAND.

"Photo-Tint" by James Akerman, 6, Queen Square, London, W.C.





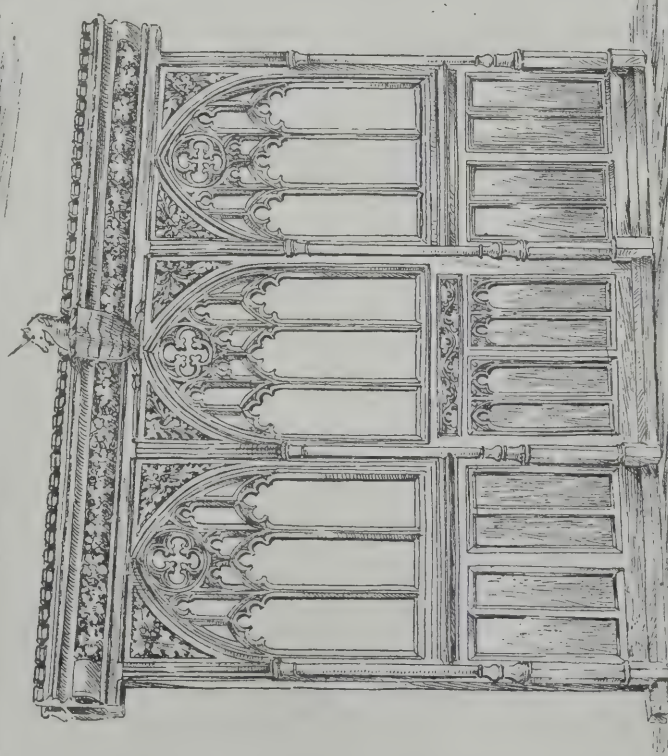




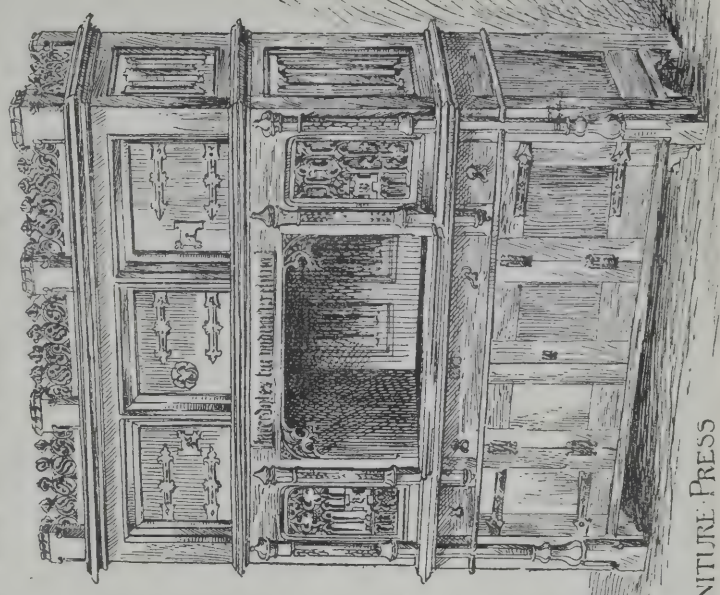
OAK ALTAR-FRONTAL PRESS  
ST ANDREW'S MONKTON WYLD



THE ALTAR-UGBOROUGH CHURCH DEVON



TOWER-SCREEN-BERRYARBOR CHURCH



ALTAR-FURNITURE PRESS

EXAMPLES  
OF  
ECCLESIASTICAL  
WOODWORK &c  
RECENTLY EXECUTED  
BY  
MESSRS LUSCOMBE & SON  
EXETER







## THE SOCIETY OF ARCHITECTS' CONVERSAZIONE.

THE fifth session of the Society of Architects was pleasantly inaugurated on Tuesday evening by a conversazione held in the New Gallery in Regent-street, W. There was a very large attendance of members and their friends, who were received in the South Gallery by the President, Mr. W. Howard Seth-Smith, and the Council. The Exhibition of Arts and Crafts arranged in the suite of rooms afforded interesting topics for conversation, refreshments were served in the North Gallery, and during the evening a vocal concert was given in the North Gallery, Miss Isabel George, Miss Rose Dafforne, Messrs. Sydney and Septimus Marsland, Edwin Easton, and G. A. T. Middleton being the soloists, assisted in the part songs by the St. Mark's Choral Society. In the minor gallery were hung two exquisite proof etchings by Mr. A. W. Rimington; these, the President mentioned, had been generously presented by the etcher to the Society for the adornment of their lecture room in St. James's Hall.

At 9 o'clock the PRESIDENT delivered his inaugural address. The notion that the Society is one, he remarked, which sets itself up in antagonism to or rivalry with the Institute is wholly unfounded. If their Society had considered it necessary to differ from the older body on the subject of the more general application of their qualifying examination, it had been with the object of raising the profession to the position it ought to hold in the esteem and confidence of the public. If any proof were wanting, he added, of the need of such a society it would be found in the fact that we number to-day 369 members and 11 associate members, and are rapidly adding other names to our list, and the arrangements now being made by your council for the greater benefit of our provincial membership will still further tend to strengthen us. Having congratulated the society on the fact that no member was in any way implicated in the recent disclosures of the Metropolitan Board of Works, the President took a wider outlook on the profession, observing that the past year has shown real progress in our art. The present rise in prices averaging about 12 per cent. on the principal building materials, is, we may reasonably hope, a sign of returning national prosperity; but, bearing in mind the comparatively small cost of materials in proportion to labour, the keenness of competition, and other considerations, this improvement does not represent a rise of much, if any, more than 2½ per cent. on the total cost of building. I am not one of those who cherish a belief that some day we may again have one national style. Architecture has at all times received its inspiration, good or bad, in proportion to the travelling propensities of its contemporary public, and science having made us all travellers in all parts of the world and familiarised us with all architectural styles, has decreed that henceforth art must be a thing of fashion. True it is, nevertheless, that great genius will brook no dictation, and as men of exceptional power appear, they will more or less give originality to the style in vogue, while humble workers must be content with developing their ideas. The higher education of architects must, however, greatly diminish the evils of caprice: a well-informed mind will reject as unsuited to our genius and climate many styles we now see pitchforked into our midst. We may reasonably hope that we have for ever done with the effort to reproduce the works of antiquity, however great; but let us work in admiring study of all beautiful design and all skilful building, whether ancient or contemporary, and cry shame upon ourselves if, as a profession, we cannot find new ideas and hints enough in science and art, at home and abroad, to modify and make our own any style in which we may have to design. Of all subjects which have occupied our minds lately, none seem comparable with the statutory education and registration of the profession. As a society, you have identified yourselves with the movement, and, I take it, intend to see it through. It is indisputable that the vast majority of our articulated pupils, at the end of their term, leave knowing less about the practical side of the work than a builder's clerk, and yet very many set up in practice and com-

plete their training at the expense of their clients' interests. After full consideration of all the objections hitherto raised to legislation, I believe in the compulsory qualification of architects, for the following reasons, namely: That education is obligatory on the public, and is daily becoming higher in standard; that technical education is making great strides, and will in all probability shortly be compulsory; that it is essential that the training of professional men shall be superior to that of those whose work they are paid to design and supervise; that we cannot rely on competition or ambition to secure systematic and sufficient training; that the science of sound and sanitary building is the first qualification of a good architect; that a thorough training in this department is compatible with the amount of artistic feeling and knowledge which is essential to the practice of architecture, and with the attainment of a power of expressing that feeling in good draughtsmanship; that it is possible to test the existence of adequate artistic power, though not its degree; that the State, in granting a charter conferring upon the Institute the right to examine on these lines, and the Institute in the exercise of those powers, have both admitted the principle of the necessity of a qualifying examination; that, however salutary the Institute examination may be, its voluntary character involves indefinite postponement of the reform needed—namely, that the public shall, by consulting a statutory register, be able to ascertain the qualifications of those they think of intrusting with such costly work on which their comfort and health and that of their families so largely depends. But while on the subject, may I suggest one or two points which, pending legislation, will, in my opinion, help us to a higher standard of proficiency. In future we must take more care whom we article, and this in the interests of the pupils as well as of the public. One or two rules suggest themselves—first, to see that the young men who apply have had a sound, though not necessarily a liberal, education. Secondly, do not let us article them till by a trial of some months we have fairly assured ourselves that they have sufficient taste and capacity for drawing and other qualities essential to making an architect. Thirdly, that they are likely to have, or be provided with, adequate means to enable them to carry on their training beyond the pupil stage, and to hold on for the first few years of practice content with making a bare livelihood, if so much. It is the omission of these precautions which swells the army of assistants out of all proportion to the demand for their services, and produces so much disappointment on the part of parents and guardians. But, to revert to more prosaic matters, the architect of to-day must be prepared to advise his clients, not only about the building, but also as to the financing of work; he must watch the state of the money market, and more especially acquaint himself with the conditions and prospects of freehold and leasehold properties. Mr. Goschen's conversion scheme early this year affected such investments largely. The effect of this measure has been propitious to house property, and for architects and solicitors rather than (permanently) for the brokers. The agitation for the enfranchisement of leaseholds is in my opinion an unjust and injurious one. Leases are invariably taken after careful consultation of their advantages, those advantages being by no means all on the freeholder's side. The leasehold system may have its defects, but it also has this great advantage, that it provides for the large number of people whose income is small a more remunerative investment than freeholds. A leasehold house and the insurance policy for the return at the end of the period of the capital invested would altogether cost less than a freehold. Glancing next at the past year's advances in construction, fittings, and other branches of our work, we note that pink terracotta, as hard and sound as the best buff, has been difficult to obtain until quite recently, but is now being made successfully. Manufacturers are also succeeding in getting all terracotta truer in shape and freer from cracks, and it is a far more reliable material to-day than it could be said to be hitherto. Architects are designing their work to avoid the large unwieldy blocks with which there was so much risk. This year has seen greatly increased demand for terra-

cotta and also for facing bricks in terracotta clay. Considerable progress has also been made during the last year in the production of glazed bricks that are soft and good in colour, and absolutely impervious to all atmospheric influences, the body of the colour and the glaze being made an essential part of the brick. I must mention also a rich brown yellow terracotta in which the lines and arrises can be made almost, if not quite, as true as stone. Marble as an internal wall decoration is being more largely used every year; one has only to visit, among the latest buildings, the National Liberal and the Constitutional Clubs, and the National Gallery, to form an opinion as to its suitability for such purposes. In a few of the more recent important public works steel box girders are adopted of considerable span, carrying loads of enormous weight. Rolled joists and joist girders are also being made of steel, but not in very large quantities: iron is much cheaper and suits most purposes, perhaps even better than steel. The steel used for constructional purposes is that termed "mild," and equal to an ultimate tensile stress of 30 tons per square inch. The result, when compared with the iron value of four or five tons per square inch, shows an immense advantage in favour of steel. The saving in money, however, is very little, if anything, as reliable steel is dearer than iron. The principal advantage lies in the fact that for carrying heavy weights steel girders may be made so much lighter than iron, and then a great saving in carriage, hoisting, and fixing is effected when the quantity is large; the same consideration also applies to the use of steel cylindrical columns and steel joists; but steel constructions are not likely to stand so well in cases of great heat. English manufacturers who could supply iron joists at or a trifle below Belgian prices would confer a great benefit upon the country. The demand for steel joists has been better met in England, although at prices above iron. The admirable system of fireproof flooring now in the market, though not quite new, has been improved in various ways during the past year. I refer particularly to the pumice concrete flooring for bearings up to 20ft. It consists of rolled steel or iron joists spaced according to the loads to be carried, filled in between and entirely embedded in this pumice concrete with a uniformly flat soffit. This material is 25 per cent. lighter, much more sound and fireproof than ordinary concrete, and can be nailed to as easily and effectually as to wood. Another great advantage of this system is that the iron joists are interlaced with strained trussed wires about every 18in., which gives great homogeneity and toughness to the floor, and prevents fracture by settlement. No expansion or contraction takes place in such floors under any circumstances. Where time is an important factor, pumice concrete slabs are laid dry, and afterwards grouted in with cement. The well-known steel trough flooring is being more than ever used for larger spans, and various methods of fixing the wood floors above and the ceilings beneath the steel channels are novel and ingenious. This fire-proof construction has been used within the past year for roofs, no fillets or boarding having been necessary; but felt is laid on a floated surface, and the lead scrolls screwed to the concrete. Among fittings, stoves and chimney-pieces deserve the first mention. There is a strong disposition to make more use of the open recess and dog grate in the reception rooms. This arises from the artistic and varied treatment of which they are capable. They are not economical in fuel, or equal in heating power to other forms. If, however, the sides of the recess are splayed, the stove set close to back of recess, and the register is made as long as the opening and placed well back, the soffit of arch or lintel being rounded off to it, the result is generally satisfactory. I have found it very important, in order to insure success, to allow the makers to fix their own fittings. For inexpensive buildings, cast-iron chimney-pieces are being more than ever used, on account of their great cheapness and durability, while many firms are doing much to improve their design. It pays well, when doing up old houses, to fix plain-coloured glazed tile hearths and fenders throughout, both as a saving of labour, to say nothing of appearance and cleanliness. Having referred to the anticipated great extension of electric-lighting



under the new conditions imposed by the Board of Trade, Mr. Seth-Smith expressed the belief that a combined use of gas for cooking, warming, and ventilating, with incandescent lights as illuminants, will become general. The Cromartie and Wenham gas lights are economical consumers of gas, and if their flues are kept regularly swept, and they are hung in clusters to obviate the shadow they otherwise throw upon the ceiling, they are very powerful and specially adapted for the dual purpose of light and ventilation. The clever Welsbach gas light is the most economical of all in point of consumption of gas, and being a Bunsen burner combustion is as perfect as possible, and the injury to decorations, &c., consequently very small as compared with all others. Electric lighting has revolutionised the old gasaliers and brackets, and well illustrates the effect of science on art. Great credit is due to the leading manufacturers for the development of beaten copper in the foliated parts; copper is too soft constructionally, but harmonises beautifully with brass. One great principle in all artificial lighting is to have no naked burners, but to diffuse the light through ground glass or silk. Wrought iron, the beauty of which was suddenly appreciated seven or eight years ago, is daily improving in design. Many architects are now having their door locks, handles, sash and casement fastenings, stays and bolts, &c., specially forged. Few details better repay the effort of designing them. The great demand for wrought iron has decreased the cost of production by exactly one-half in the last four years. In conclusion, the President referred to the prospects of the forthcoming session, expressing approval of the plan about to be adopted of adjourning the discussion to the meeting succeeding that at which the paper is read, and of the suggestion of the Council that two or more members should agree to devote time and thought to a given subject, with a view to compiling joint papers which will embody their experience. The deliberations of such friends in council, on any such subjects as foundations, walling, forms of contract, if crystallised into a report, would be worth, he thought, twenty papers written by individual members.

The EARL OF WINCHILSEA and NOTTINGHAM, in proposing a vote of thanks to the PRESIDENT, remarked that the Society must be congratulated on its choice of Mr. Seth-Smith as its head for the coming year, for in his hands the presidential office would lose nothing in personal dignity and character. Such a society as that was doing excellent work not only in uniting in one bond of fellowship the excellent architects spread over the country, but chiefly in its efforts to secure by legislative aid that all persons entitling themselves architects should obtain a hall mark of ability to perform its duties by passing an examination. Such a test was absolutely necessary, as architecture dealt not merely with the fair exteriors of buildings, but with their details of construction and sanitation. On another matter the lay mind would not be so much in accord with the President as were the members—namely, in the recent rise of  $12\frac{1}{2}$  per cent. in the price of materials; it was manifestly a matter for congratulation to architects, but hardly so to their clients. As the owner of certain quarries of building stone in the Midlands, he hoped personally this was the case, but he had not experienced the increase in prices at present. Architecture differed from her sister arts in that her works could not so easily be destroyed; paintings could be burnt or removed, sculpture was readily injured, but a work of architecture withstood the ravages of time, and even if it suffered a little it could be restored to us. The great hope for architecture lay not in copying the works of the past, but in reproducing their spirit and character in our designs; we should observe that harmony and proportion which were manifest in the works of the elder men, but above all go, like them, to the fount of nature for inspiration.

Mr. ROSHER, Master of the Carpenters' Company, seconded the vote of thanks, which was carried by acclamation, and suitably acknowledged.

New offices are about to be erected at Bristol for the County Fire and Provident Life Offices, of 50, Regent-street, London, W. The architect is Mr. E. Henry Edwards, of Clare-street, Bristol.

#### NOTES FROM EDINBURGH.

THE City affairs appear to be in a prosperous condition from the recently-issued report of the City Assessor. There has been an increase of over £28,000 in the assessable rental, and of nearly £40,000 in the whole heritable property. This shows that there is still a large percentage of unlet premises; but, notwithstanding, the civic rate has again been lowered, and stands for the coming year at the low figure of 1s. 10d. per pound for owner and occupier combined. This result is owing to the great increase of the suburban districts, where, as the municipal expenditure is a constant quantity, the outlying districts are beginning to bear their fair share of the burden of taxation.

The growing desire for the means of physical recreation has shown itself in the policy of successive provosts and councils, who, since the acquisition of West Prince-street Gardens for the public, some years ago, have been adding parks and gardens and an arboretum to the city. Once, Arthur's Seat was the only eminence from which the citizen could contemplate the city and its fair surroundings, and it was popularly believed that, when the weather permitted, some lover of the picturesque was always to be seen upon its summit. The Town Council are now, however, in possession of every hill-top in the neighbourhood, if we except Corstorphine, which as yet is rather far away from the suburban limits. Blackford Hill has been provided with a shelter for the visitor in form of a summerhouse 40ft. long, with glazed centre partition for protection from the wind, returned some way at either end. It does not improve the picturesque outline of the hill from below, but is a wise provision for the wearied climbers. A memorial to Lord Provost Harrison has also been erected as an entrance gateway, to commemorate his services as having carried out the purchase of the property. It is in the style of the Classic triumphal Roman arch, and looks on the place so far from City architecture. The Braid Hills, a little further south than Blackford Hill, secures the acquisition of good golfing ground, and the preservation of picturesque surroundings for the southern suburbs.

The next purchase will probably be on the north side, where a park suitable for healthy exercise is much required; and the improvement of the valley intersected by the Pitt-street thoroughfare is also under consideration—both being very necessary undertakings to preserve the amenity of the northern portion of the city. The aspect of the latter, a conglomerate of ugly and ill-constructed shanties in the form of shops and workshops, suggests want of decency, which is said to be want of sense, on the part of somebody—or of the need of additional powers to the Dean of Guild Court—to prevent the erection of such buildings in neighbourhoods where everywhere around buildings must adhere to the style of the surrounding streets.

The water supply question is also coming to the front once more; but in the mean time are to be taken to ascertain the amount of water wasted by leakage from the mains, which some parties assert to be sufficient, if prevented, to postpone for many years the necessity for providing any additional supply.

The improvements at the Castle are now completed so far as the mason work is concerned. The buildings are also roofed and floored, and ready for the finishings. They comprise the erection of a principal gateway and a private entrance, with a long stretch of curtain wall, guard-room, storehouse, officers' quarters, &c. The bridge leading to the principal entrance is carried on arches built up from the moat, stopping short at the drawbridge, which lifts into the recess provided for it in the gateway. Behind this is the great oak door. To the north of the entrance is the officers' quarters, the kitchen on the ground floor, and long rooms above, with oak panelled ceilings. All other apartments and offices are on the south.

The buildings are a decided improvement. The old arrangements were meagre, and exposed a great amount of rude masonry to view. This is now concealed by the curtain walls. The Mediaeval style and details are faithfully preserved, the gateway having a central tower, with house on top, corbel-stepped gables, corbelled parapet, and bartizans at the angles in front. The tower is rather low over

the curtain, and there is much evident avoidance of symmetrical arrangement. But the peculiarities are probably conditioned by the exigencies of the plan, and the very low attitude of the tower is not so unbecoming in its position at the base of the lofty roof immediately behind. The new addition, which that recently completed, the Argyle tower, was much needed to give something more of dignity and importance to the entrance. The work of the old Parliament House has not made progress for some time past, and still remains half finished.

The western wing of the Industrial Museum is now ready for reception of its contents. The names of eminent engineers are emblazoned on the highest gallery. The plaster modeller has not yet finished the details of the large doorway which fills up the south end of the interior. It is a facsimile in Parian cement of the doorway of Bologna Cathedral. The scaffolding conceals the proportions and details; but there seems to be a vast amount of sculpture panels and figures, which, with its great altitude, 40ft.—will give most of its visitors some better notions of a cathedral and its doorway.

The march of improvement seems likely to overtake a well-known building in the city, little respected as an architectural object, the West Church, which may be called the mother church of modern Edinburgh, as most of the new towns are built in the parish. No better specimen of Presbyterian church architecture and arrangement could be found, and had the builder only given it respectable masonry on the exterior, it would easily hold its own with some more ornate modern examples of that architecture, with their inconsistencies of proportion and details. The masonry, however, is rubble of the commonest description, but with a respectable Classic spire. Like all old Presbyterian churches, it retains the plan of the basilica, but places the pulpit in the centre of the length, and not at or near one end of the interior. In churches, big or little, great economy of floor space was thus attained, and where a church was very large (as is the case with the West Church, seated for 2,500), the acoustic advantages are great. Parties responsible for the erection of parish churches are bound to give a certain length of seat, but are not limited to any minimum of air space, and most of the old churches are thus packed so economically as to make anything like proper ventilation of a crowded church impossible. Such has been the condition of the West Church for many years, and the authority of the Dean of Guild Court has been required to start a movement for the improvement of the ventilation and very defective exit arrangements for a congregation so unusually large. At the present stage, plans have been approved which will greatly improve on these defects, but the large sum of £10,000 or more will be required to do it, and as this is not much less than the cost of a new church, it would appear wiser to have a new one.

The Church of St. Giles, which is the mother of the churches of the old town, has got into some trouble from the increasing numbers attending the service, and for which the only remedy is an Act of Parliament. All the seat-rents of the city churches are payable to ecclesiastical Commissioners, and as the session of St. Giles gave that body only the proportion of seat-rents paid by the congregation occupying the choir of the old building (the nave having been another parish church provided for elsewhere by the restoration), the Court of Session decided that this disbursement was illegal, and that money paid for any part of the seating was due to the Commissioners. As the Commissioners receive the rents of West St. Giles the new church built for the congregation dispossessed, the public are disposed to side with the kirk session, and a Bill is to be introduced to carry out what is plainly equitable. The position taken up by the session as to their being a sort of "cathedral Board," keeping up services for the general public, is less defensible. St. Giles's Church, as a "Cathedral," has no creditable history from any point of view, religious or political. It very soon ceased to be one. But St. Giles, as the parish church of the city, growing with its importance, has both historic and architectural interest, and to call it a cathedral now is only to provoke invidious criticism from those who know what



9) 3163 4



(4) on cement.			Run. Frame b.s.	
Supl.	Deduct.		measured.	
10 1	40 8		696 0	
14 8	39 0		932 0	
502 10	117 0		74 8	
63 11	13 0		100 0	
63 11	1 10		34 8	
106 9	211 6		132 0	
112 0			116 0	
114 0			116 0	
180 3			76 0	
140 11		Run. Flush beads cut in.	37 0	
68 3			70 0	
66 6	449 8	Deduct.	70 0	
196 4	28 0		12 6	
49 0	477 8		12 6	
49 0	55 4		26 0	
1738 5	422 4		4 4	
211 6			12 6	
1526 11			2414 0	
170yds.			Balls, &c.	
			89 6	

## Ends of rafters, &amp;c.

78	Squares.	Twice varnish on.
40	240	
12	480	
130	32	Supl.
	24	27 0
	20	42 9
	20	4 6
	20	8 3
	64	147 0
	144	22 9
	144	72 0
	144	2 0
	8	97 10
	4	12
	4	119 1
	4	317 3
	8	163 6
		61 9
		7 9
		11 7
		78 8
		84 6
		9)1268 2
		141 yds.

## Frames b.s. measured.

298 0	Squares.	
466 0	120	Casements, &c., 1ft. 10in. by 2ft. 6in.
37 4	240	12 Do. 3ft. 5in. by 2ft. 6in.
50 0	18	12
54 8	12	Ditto 3ft. 2in. by 2ft. 6in.
132 0	20	4 Do. 1ft. 11in. by 1ft. 11in.
116 0	64	12
38 0	144	Casements.
18 6	8	12
70 0	12	2
12 6	636	4
1273 0	53 dozen.	12
		2
		4
		4
		12
		24
		24
		82

## EXCAVATOR.

N.B.—The usual preliminary clauses, similar to those for the detached house, would come in here.

Yds. ft. in.		£. s. d.
199 0 0	Cube. Dig and cart from surface ...	
75 0 0	" do. do. from trenches, not exceeding 8ft. deep.....	
155 0 0	" do. from do., part return, fill, and ram .....	
	Allow for all necessary planking and strutting .....	
	Allow for any necessary baling and pumping or temporary drainage to keep foundations free from water .....	
123 0 0	Cube. Dry brick rubbish filled in, well rammed and levelled .....	
750 0 0	" Concrete as described in foundations.....	
383 0 0	Supl. Do. 6in. thick, spread and levelled under wood-block flooring, &c. ....	

## DRAINS.

All pipes to be the best salt-glazed, with Stanford's patent joints, the joints, well greased, laid to proper falls. The drains to be inspected by the architect, and tested in his presence before being filled in.....		
0 172	Run. 3in. pipe, and digging averaging 2ft. deep .....	
76 0	" 4in. do. and do. ....	
0 198 0	" 6in. do. and do. 3ft. deep ....	
100 0	" 9in. do. and do. 5ft. deep ....	
	No. 10. Extra to bends in 3in. ....	
	No. 8. Ends rain-water pipes made good to drains .....	
	No. 30. Do. drain-pipes do. to brick chambers.....	
	No. 7. 6in. siphon traps, with cleaning arms and caps, and fixing in drain with concrete bed ....	
	No. 2. Hellyer's patent 9in. gullies and fixing and concrete bed .....	
	No. 2. Do. grease traps and do. ....	
	No. 1. Entry into sewer, including galvanised flap and frame, built in cement, for 9in. pipe, and pay fees.....	

## INSPECTION CHAMBERS.

20 0 0	Cube. Dig and cart, not exceeding 8ft. deep, small parts return, fill, and ram .....	
0 994 0	Supl. Planking and strutting to sides of excavations .....	

Yds. ft. in.		
5 0 0	Cube. Concrete as described in foundations .....	
173 0	Supl. Reduced brickwork in mortar, including all rough cutting.....	
4 0	" Extra to neatly axed segmental arch in two half-brick rings.....	
17 0 0	" Rendering in Portland cement on walls .....	
2 0	" Do. circular soffit .....	
3 3	Run. Aris to circular soffit .....	
	No. 8. Dishing up around culverts in cement .....	
	No. 2. Glazed stoneware culverts for two pipes .....	
	No. 1. Do. for three do.....	
	No. 2. Do. for four do. ....	
	No. 3. Do. for five do. ....	
	No. 7. Dyer's air-tight cover 2ft. by 1ft. 6in. and fixing in stone curb .....	
0 0 63	Run. 9 by 6 Yorkshire stone, tooled and rebated curb, and setting in cement, including joints, &c. ....	

Continued ..... £

## CHIPS.

Mr. S. H. Terry, C.E., one of the inspectors of the Local Government Board, held an inquiry on Friday at Eccles as to the application of the Barton and Eccles Local Board for sanction to borrow £10,170 for works of private street improvement, and £250 for the erection of sheds, storeroom, and boundary wall at the Town Hall.

A new Wesleyan chapel in Springfields, Wolverhampton, was opened on Monday week. The chapel is in the Early English style, faced with red bricks and Bath stone dressings, and will accommodate nearly 400 persons. The total cost is about £1,300. The builders were Messrs. Bradney and Co., and the architect Mr. Weller, all of Wolverhampton.

The jubilee statue of Her Majesty the Queen, which is to be erected in the Government-house, Singapore, has been placed in the hall of the Colonial Office for private view. The statue is of pure Carrara marble. The sculptor is Mr. E. E. Gefowski, of 428, Fulham-road.

Over thirty members of the Architectural Association attended Mr. H. Lovegrove's first lecture. The second, on Friday, the 23rd inst., will be on "Drainage and Sanitary Work," an entirely new paper on that important subject.

A new village club and reading-room, erected at Willington, near Crewe, was formally opened last Saturday. The building is of red brick with gable ends, and was designed by Mr. T. Bower, of Nantwich, the builder being Mr. Henry Fleet, of Kelsall.

The Peterborough Cathedral Restoration Committee have decided to arch over the remains of the Saxon church recently discovered under that fabric. A T-shaped crypt will be formed, taking in the chancel of the Saxon church and part of the south transept and north transept. The latter portion has the additional interest that one of the original plaster seats still remains attached to the wall. The Saxon plaster floor will form the floor of the crypt. The cost will be comparatively small, now that the excavations have been made—viz., about £100.

Permanent buildings are about to be erected for the technical schools started some six years ago by the Drapers' Company in connection with University College, Nottingham. This will enable the good work so successfully carried on in a small way to be largely developed. The scheme is on the same lines as the Clothworkers' Technical School attached to the Yorkshire College at Leeds, erected some time ago.

The granite pedestal which is to carry the new equestrian statue by Boehm of the Duke of Wellington was placed in position on Monday, opposite Apsley House, Piccadilly. The surrounding ground has been laid with asphalt and granite, after the same style as Trafalgar-square, and is to be planted with trees. On the pedestal, which is of plain brown marble, are the words "Wellington" and "Waterloo." The statue itself, at present enveloped in sacking, has been placed upon it, and will be unveiled in a very short time.

At a meeting of the Withington local board it was reported that at a recent meeting of the highways committee Mr. W. Swarbrick, Assoc. M. In. C. E., had tendered his resignation of the office of surveyor, which position he had held since 1877.

The Queen's Hotel, Brixham, recently destroyed by fire, is about to be rebuilt from designs by Messrs. Franklin Cross and Gething, architects, of Birmingham and London. A block of eleven cottages adjoining the above hotel, is also to be built from the same architect's designs.

An important addition has just been made to St. Jude's Church, Sheffield, in the form of a handsome brass eagle lectern, of conventional design. This was supplied by Jones and Willis, of Birmingham and London.

## Building Intelligence

BALLACHULISH, N.B.—A chancel has been added to St. John's Church, built in 1810. The work has been executed at a cost of £2,000 by Messrs. D. and A. Munn, Oban, from designs by the architect, Mr. D. Mackintosh, Oban. The new chancel is in harmony with the old part of the building, which is Early English style. The east gable has three lancet windows, the centre one being the longest. All internally is finished with lath and plaster, and arches have label mouldings boldly treated. The portion of the nave east of the transept now becomes the choir, and the north part forms the sanctuary. The roof is barrel vaulted, with moulded ribs forming panels, of pitch pine. The glass in the windows is by Mr. A. C. Hemming, of London. The south transept has now become a choristers' vestry, and the pulpit has been lowered and otherwise altered. The altar and reredos, both of which were designed by the Rev. J. W. M. Weddell, Ballachulish, and carried out by Ballachulish workmen, under the superintendence of Mr. John MacInnes, contractor, Ballachulish.

BROMSGROVE.—The recently finished tower of All Saints' Church was dedicated on Wednesday week. The church itself was erected in 1872-4. The tower, which is situated at the north-west corner of the church, is square plan and buttressed at the angles. It is built in three stages, the lower stage, which constitutes the baptistery, having been erected with the church about fourteen years ago. The rectangular buttresses of the two lower stages are carried up as pinnacles about 3ft. square, between which runs a pierced and cusped parapet inclosing the top of the tower, which is covered with a York stone table and a pyramidal roof dressed over with lead. The walls are built with brick, faced with sandstone ashlar and dressings. The tower is of Early Gothic style, harmonising in design and character with the church. The height to transept is 83ft., and about 98ft. from the ground level to the top of pinnacles. The contract for the work was £1,295. Mr. John Cotton, of Bromsgrove and Birmingham, from whose designs the church was built, was the architect, and Mr. J. Brazier, of Bromsgrove, the builder.

MANCHESTER.—On Saturday the memorial stone was laid of the workshops and institute for the blind now in course of erection at Deansgate, Manchester. The basement will be used as a workshop for the heavier classes of goods. Upon the ground floor will be situated the offices of the secretary, and with these exceptions the whole ground floor will be utilised at a retail shop. Upon the first floor will be the board-room and a large room suitable for the meetings and services of the blind. The next two floors will be used as workshops, and the topmost floor for storage. The whole building will be heated by steam. The materials used in construction are stone and brick and red terracotta. The plans have been designed by Messrs. Heathcote and Rawlinson, Princess-street, Manchester; and Messrs. Wilson, Toft, and Huntley, City-road, are the contractors. The total cost of the land, buildings, and fittings will be about £11,000. The buildings were illustrated in our issue of the 10th August last.

The restored chancel of Penkridge Church was reopened on Friday. The walls have been cleaned and painted, and considerable alterations have been made to the roof. The sacarium floor has been paved with black-and-white marble, and in it is inserted a marble slab presented by Margaret Lady Hatherton, in memory of her late lord. Much of the finer work has been done by Mr. Bridgeman of Lichfield. Mr. J. A. Chatwin, of Birmingham, was the architect for the alterations.

The ceremony of laying the foundation-stone of the new church at Bedworth was performed on Monday afternoon by the vicar of Nuneaton. The old church, erected in 1606, has been pulled down, all that remains being the tower and a transept added at a later date.

A new Liberal Club has been opened at Reading, the ventilation of which has been carried out by the Boyle system, the latest improved form of the Patent Self-Acting Air-Pump Ventilator being adopted for the extraction of the vitiated air.



**TO CORRESPONDENTS.**  
[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many ailments upon the space allotted to correspondents.]  
It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.  
Cheques and Post-office Orders to be made payable to J. ASSMERE EDWARDS.

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Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII, XLVI, XLIX, L, LI, LIII, LIII, and LIV may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.  
Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.  
RECEIVED.—J. B. F. and Co.—J. W.—R. B. and Co.—J. H. and Son.—T. G.—V. B. of C.—L. M. O.—M. and N.

Correspondence.

MR. WATERHOUSE ON QUANTITIES.

To the Editor of the BUILDING NEWS.  
SIR,—Mr. Waterhouse in his address says: There is another point of professional practice in which we might probably see more justice done than at present. We are in the habit of regarding bills of quantities issued to competing builders as final instruments incapable of containing error, unless the successful builder finds it out between the day on which he sends in his estimate and the day he signs the contract, which may be the day after. Are we in these matters as scrupulous as we ought to be that justice be done to the builder? His lot, owing to the severity of the competition to which he is generally subjected, is a sufficiently hard one without our making him practically responsible for other men's errors." I make bold to assert that hundreds of builders will thank Mr. Waterhouse for his pointed and powerful condemnation of one of the most contemptible and damnable practices that seem to have sprung into existence in the last quarter of a century amongst the architectural profession—namely, saving themselves, their surveyors, and the building owners, at the cost of the poor contractors, by inserting a clause, or clauses, in the contract exonerating all three from any responsibility for any work indispensable to the proper construction of the building, but omitted from the quantities. We talk a great deal at the present day about pure air, water, and food; but it is, I think, quite as essential to the stability of any profession to have something approaching "pure conduct": but there is no doubt the public analyst is required in the architectural world (or else the sanitary inspector). At any rate there is

some ray of hope if such eminent advocates as Mr. Waterhouse takes the case in hand. Builders will then be able to get recompense for any work done and omitted from the quantities through one or two things, either the inability or carelessness of the architect or his surveyor.  
Why not do as I know one or two eminent firms of architects do—namely, let the priced schedule be the basis of the contract, then at completion their surveyor to measure off any additions or omissions, as the case may be! In this case the contractor gets paid his due, and does not get swindled (by a legal quibble) through the incompetence or ignorance of the architect or surveyor, or both.—I am, &c.,  
Leeds, Nov. 12. R. B.

**CLAUSES IN BUILDING CONTRACTS.**  
SIR,—The many questions involved in the composition of a building contract have recently received considerable attention from the architects of Exeter, and upon the basis of a form submitted by the Exeter Builders' Association, and adopted by the National Builders' Association, purporting on its title-page, although in error, to have received the sanction of the Royal Institute of British Architects, they formulated a set of clauses, 22 in number, which they ventured to assume sufficient for all contingencies likely to arise in carrying out a building contract. This view is not, however, held by our local Builders' Association, and it has been suggested that, with your permission, I shall insert the substance of a correspondence I have conducted with the Institute, with a view to obtaining a general consensus of opinion upon at least one question which is of vital consequence both to builders and employers in contracting upon quantities.  
In the form published by the National Builders' Association, and, I believe, confirmed in the one particular to which I shall refer by the R.I.B.A., the quantities are made a part of the contract, and all errors are to be rectified at any period during the progress of the contract, and up to the time of its final settlement, upon a request in writing by the builder. It is quite clear that the operation of this condition would in most instances be one-sided, because the builder, whilst he would intimate to the architect all deficiencies, would hardly be likely to note any excesses, and, therefore, to make amendments in favour of the builder, without at the same time investigating probable set-offs in favour of the employer, would be an injustice which needs no comment. Moreover, under such circumstances, a definite and settled sum would never be ascertainable until after the building is completed, and all that an employer could be said to have accepted would be a schedule of prices, variable both in the aggregate and detail as may be found necessary. In London and the larger towns, where the taking out of quantities is confined almost exclusively to quantity surveyors, the process of checking each item would not be so heavy as in the provinces, where architects mostly supply their own quantities, and where, if there is to be no limit to the period permitted for the rectification of errors, a man with a large practice may have much of his time occupied over a constant overhauling of the items of each bill of quantities consequent upon the pettish use of an unfair weapon in the contract.

In my own experience I have never yet known a case in which, when a complaint has been made that the quantities are "slack," they have not also been found to be "full," and in many cases of alleged error, they have been proved, upon analysis, to have no foundation. Holding these views, therefore, my professional brethren determined upon a limit of 21 days from the date of signing of contract for the rectification of errors, which they thought ample and reasonable opportunity. Any opinions on this matter, or any kindred subject relating to contracts which you may permit to be inserted, will be esteemed.—I am, &c.  
JAMES CROCKER, F.R.I.B.A.  
Exeter, Nov. 13.

At the annual meeting of the Royal Scottish Academy, held in Edinburgh on Wednesday, Mr. George Ogilvie Reid (Edinburgh), Mr. Thomas Scott (Edinburgh), and Mr. James Guthrie (Glasgow) were elected associates of the Academy.

Intercommunication.

QUESTIONS.

[9826].—**Building Leases.**—What is the usual commission for letting large plots of ground on 99 years building leases when no plans are required?—KIMBO.  
[9827].—**Air-tight Window.**—A customer of mine has ordered me to fix him an air-tight glass case to his shop window. The cubical contents are about 350ft. Since this has been done he is constantly troubled with damp or vapour on the inside of the window, so that the goods cannot be seen from the outside. To all intents and purposes I have made the case air-tight. How does the damp or vapour get in, or how can I get it out? Can anyone enlighten me?—AIR-TIGHT.  
[9828].—**Private Water Supply.**—Will any reader kindly inform me whether any private person or firm can supply water for domestic consumption to the public in the district of either an urban or rural sanitary authority, or within the area governed by a local board or town council, without first obtaining Parliamentary sanction, and if so, what obligations would this private person or firm be under.—A. K.  
[9829].—**Bankruptcy of Contractor.**—What is the proper course to be pursued by an architect when a contractor becomes bankrupt before the work on which he is engaged is completed? Any information from those who have had experience in such matters will be welcome.—SPES.  
[9830].—**Professional Charges.**—A is a professional man in York, B is his client in Stroud. B instructs his architect (A) to prepare plans, specification, and quantities. After tenders have been invited, B intimates that he will superintend the erection of the work himself. What would be a fair commission for A to charge his client B?—INQUISITIVE.  
[9831].—**Light.**—My house is a corner one, the side street is only 10ft. wide; on the opposite side is an office with a large window 8ft. wide by 12ft. high on the ground floor only. All the other windows are in the High-street. Can I raise my house (which is now 38ft.) two stories? It has been built over 50 years. The office window opposite I imagine to have been built about 15 years. Another architect whom I have consulted says that I should have to keep the additional stories within the line drawn from the top of the office window through the top of my parapet wall. An answer will greatly oblige.—GWILT.  
[9832].—**Swimming Baths.**—Will some reader give me dimensions of some recently erected public baths? I want more especially the size of swimming tank.—NATATOR.  
[9833].—**Wooden Houses.**—Now and then one hears that timber-framed houses could be imported from Norway in sections ready for erection so cheaply as to compete with brick-built native constructions; but thus far I have not been able to see one or obtain definite information concerning such a building. I presume they would only hold their own in the metropolis or in places on the east coast where no land carriage would be necessary, as transport by rail would unduly raise the cost. In any case, would not such a house infringe local by-laws if founded on the L.G.B. by-laws—see sections 11, 11a, and 22, and be quite contrary to the spirit of the Metropolitan Building Acts? What measures are taken to render them un inflammable, and are they comfortable as dwellings? If any reader has tried the experiment, his experiences will oblige.—PIG IN A POKE.  
[9834].—**Wind Force.**—Will some reader kindly show me the proper way to answer the following question, and the best book on the subject, and price?—What wind force per foot super. would overturn a 14in. brick wall, 10ft. high, and weighing 108lb. per foot cube, neglecting the strength of the mortar?—A. S. I.  
[9835].—**Sizing and Varnishing.**—I have a good deal of sizing and varnishing (deal, red, yellow, and spruce) to do, and am puzzled with this difficulty—that sometimes in putting on the second coat of varnish there will be apparent greasiness on the work, necessitating an application of a damp leather between the coats, and what puzzles me is that it only happens occasionally—perhaps once in six times, but that is one too many for me over a lot of work. Can any of your readers inform me of the cause of this, and if there is any preventive? If so, I shall be glad, as I have tried all sorts of remedies without success.—W. BONNAMY.

REPLIES.

[9705].—**Emigration.**—Amongst the "Replies," "Maori" suggests British Columbia or California. The towns on this coast are subject to "booms," a sudden high tide of prosperity, succeeded more or less quickly by a low tide of stagnation. If "Angus" is a young man with good staying qualities and decided energy and ability, he may, over a period of years, make more here than in England, but living is fully 30 per cent. dearer here. Many lawyers and architects have come here from New Zealand, and now there are many more than can find employment. The glorious pictures of the Colonies are simply scandalous and fraudulent lures got up by land speculators. Vancouver lives principally upon new arrivals who bring in money and spread themselves out; but, bar the money laid out by these innocents and by speculators (who in turn seek to draw others to the fold), there is very little to collect. A young man will do better in the Western States, where many (I don't mean architects) become rapidly rich, and build without stint or taste.—T. C. S., Victoria, British Columbia.  
[9804].—**Draught in Church.**—"Cleric" does not say what the roof is made of, and whether it is flat or not. He says, "A perforated board running along the ceiling leads into the roof." I suppose he means into the garret, between the ceiling and the outer roof. It is likely that when the gas is lighted the heated air will rise upwards, and then cold air will come down from either the ceiling or from the garret through the perforated holes above referred to. According to "Cleric's" own confession, there is no proper provision made for outlet



ventilation—"from motives of economy." Now one might as well expect not to be hungry if, "from motives of economy," he stopped eating, as expect to have a church properly ventilated when no proper means are provided. "Cleric" should advise the congregation to stop the perforated holes into the garret (unless they can be made to serve) and have the outlet ventilation of the church properly provided for. I have had cases of this sort before and cured them. If "Cleric" chooses to give me his address, I will send him some illustrated circulars re ventilation of churches and schools, or he may get further information by a perusal of the new edition of my book on Plumbing.—W. P. BUCHAN, S.E., Glasgow.

[9815].—**Architect's Charges.**—"An Injured One" should make a charge for the first set of plans in each case, sufficient to cover the time occupied in their preparation.—H. L.

[9816].—**Lights.**—If the flow of light to the windows of the building A. has been enjoyed for 40 years, there can be no question that the right to such flow of light has become absolute and indefeasible. The members of the club could, of course, take the extreme course of knocking down the wall of the building to be erected on B. The more proper, and undoubtedly the safer mode of procedure would be for the persons in whom the club-house, &c., is vested to apply for an injunction to restrain the building being erected in such a manner as to interrupt the flow of light to the windows in A.—R. WATSON.

[9816].—**Lights.**—If "B." builds so as to interfere directly or laterally, or both, with the windows of the club, an injunction can be obtained to restrain him, and if the wall is partly built, an order to pull down can be obtained; but the trustees should be prompt in instructing their solicitor and surveyors, the latter preparing plans and models.—H. LOVEGROVE, 26, Budge-row, E.C.

[9819].—**Cement, &c., Measure Boxes.**—A box 18in. long by 16in. wide and 9in. deep, would take one bushel of cement. Another box the same size, but twice the depth, would take the sand, and a box 36in. long, 16in. wide, and 18in. deep would take the four parts of metal.—H. L.

[9820].—**Estimate.**—Churches are sometimes estimated at from £5 to £10 per sitting, and schools from £6 to £10 per child, but very little reliance can be placed on such estimates. Why not ask some practical man for his opinion, as in both cases so much depends upon the style of work, size, &c.—H. LOVEGROVE.

[9823].—**Drawings.**—"Objection" should retain the original drawings, and supply the town authorities with tracings on linen.—H. L.

## LEGAL INTELLIGENCE.

**MOVABLE SHUTTERS AND THE ACQUISITION OF EASEMENTS OF LIGHT.**—**COOPER V. STRAKER.**—(Chancery Division).—Mr. Justice Kay gave judgment on Saturday in this case, which raised a much discussed question—viz., what amount of user is requisite to entitle the owner of a building at the end of twenty years to the right of receiving the light which passes over his neighbour's land to that building. The plaintiffs, Messrs. Cooper, wool warehousemen, are the owners of a large warehouse near Bishopsgate-street, built in 1864, used for the storage, inspection, and sale of wool, and have windows and glazed loopholes on each of five floors, some of the windows and loopholes being, it was alleged, ancient lights. Most of the windows, including those alleged to be ancient lights, were fitted with iron shutters, which were usually kept closed, but were opened four or five times a year prior to and during the public sales of wool. The defendants are the owners of a piece of land separated from plaintiffs' premises by a narrow alley. On this land there were formerly low cottages and stables, but in November, 1887, defendants erected on the site thereof new buildings of much greater height. The trial occupied the greater part of three days. Mr. Justice Kay, in summing up, found the result of the evidence was that the shutters of all the windows were occasionally opened for the purpose of admitting light to the several rooms; that this occurred very seldom to the window on the ground floor, more frequently on the first floor, and still more often on the second floor. With respect to all these five windows, he thought that the shutters were more generally closed than opened. The learned Judge proceeded: "The plaintiffs' claim is rested on section 3 of 2 and 3 Will. IV., cap. 71, which enacts 'that when the access and use of light to and for any dwelling-house, workshop, or other building shall have been actually enjoyed therewith for the full period of twenty years without interruption, the light thereto shall be deemed absolute and indefeasible.' The section requires that two things shall have been enjoyed—"access," which means over the neighbour's land, and "use," which must be the use of light so coming by the person who claims the right conferred by the statute. Both that access and use must have been actually enjoyed with the house, and for the full period of twenty years without interruption. It was decided in "Flight v. Thomas" that the "interruption" there meant is explained by section 4 to be an interruption by the owner of the neighbouring land acquiesced in for a year. No such interruption has occurred in this case. It is not suggested that the plaintiffs have abandoned their right, as in "Moore v. Rawson," where the owner of the house had done so by pulling the house down and building on its site a stable having a blank wall, which existed about 14 years

without any window. But the argument is that the plaintiffs have not enjoyed the use of light to these windows, or, at any rate, to the ground-floor window, within the meaning of the statute. That depends upon the signification of the words "actually enjoyed." Enjoying the use cannot mean shall have continuously used. If that had been the intention of the statute some such word as "continuously" should be found in this section, and it might then be necessary to show that the plaintiffs had never closed their shutters for a day during twenty years next before the action. I take "enjoyed" to mean "having had the amenity or advantage of using" the access of light. That is nearly equivalent to "having had the use," the intention being that the owner of a house may acquire the right to have the access of light over adjoining land to an opening which he has used in such manner as suited his convenience for the passage of light during 20 years. In "Yates v. Jack" Lord Cranworth decided that the right conferred by the statute is an absolute indefeasible right to the enjoyment of the light without reference to the purpose for which it has been used. This was concurred in by Lord Chelmsford in "Calcraft v. Thompson." In "Courtauld v. Legh" it was decided that the right was acquired for a house which was completely built and had windows in it, though it was not internally finished, and had not been inhabited except for a portion of the 20 years before action brought. It was held that this was an enjoyment by the owner of the use of the light, one of the learned Judges saying that this view met the justice of the case, because the intention to use the windows was unmistakably indicated. Baron Cleasby says that the fallacy of the defendants' arguments was "in assuming that for actual enjoyment of light the party having it must take all the benefit which he could derive from its use." Baron Channell intimates that there might be an exception in the case of windows with iron shutters fixed behind them, but the essential word in that sentence is "fixed," which obviously means either shutters that will not open, or shutters that are never, in fact, opened during the 20 years. It was argued that such a use as was made of the windows in this case would not intimate to the owner of the adjoining land that light was being enjoyed. I do not agree with this argument. If it be essential that the light should be so enjoyed as to give him notice, the window openings in this case were formed in 1864. The shutters were movable; they were opened from time to time; and he must have been extraordinarily negligent or indifferent if he did not from these facts understand that a right might be gained. I am of opinion that, in the case of windows with movable shutters, which are opened at the owner's pleasure for admission of light, the right is gained at the end of 20 years if he opens them at any time he pleases for the admission of light during those 20 years, and there is no such interruption of access over the neighbouring land as is contemplated by section 4. In such a case the onus is thrown upon the owner of the neighbouring land to prove that the right has not been gained. In this case he has not proved this. Under the circumstances, the plaintiffs have acquired an absolute right to all the light coming to their ancient windows over the defendants' land, as it has come during the 20 years next before this action, just as though these windows had been open for the admission of light during all that time. I must now grant a perpetual injunction to restrain them from erecting any building upon their land which will interfere with the light coming to the plaintiffs' ancient windows more than the building recommended by the umpire. The defendants have been wrong throughout, and must pay the costs of the action and reference.

**PAYMENT OF QUANTITY SURVEYOR'S CHARGES.**—**HARDING (TRUSTEE) VERSUS GUARDIANS OF THE CITY OF LONDON UNION.**—(Nov. 9, Before Mr. Justice Grantham).—This action raised the point whether a building owner is entitled to retain in his hands from the amount due to the builder the amount due to the quantity surveyor for his charges, for the purpose of paying over the same to the quantity surveyor, so as to entitle the owner to set off the same in the bankruptcy of the builder; or whether the building owner must hand over the same to the builder to pay over to the surveyor; himself, in the event of the same not reaching the surveyor, having a mere right to claim for the same against the bankrupt's estate. The plaintiff's claim in form was, as trustee in the bankruptcy of a builder named Albert William Derby, for a sum of £52 7s., the balance due, under a contract between the builder and the defendants, to a quantity surveyor for his charges in preparing the bills of quantities, which sum defendants had themselves paid directly to the quantity surveyor. The builder had given a charge over all his right under the contract to one Wright, who consequently claimed to call upon the defendants to pay again to him the amount they had already once paid to the quantity surveyor. The legal right, if any, being in the trustee in bank-

ruptcy, the nominal plaintiff was the Chief Officer, Receiver of the London Bankruptcy Court, a learned Judge, after hearing the arguments, gave judgment in favour of defendants. The building owner was entitled, under the circumstances, to pay the quantity surveyor himself directly out of the moneys due to the builder, and was not therefore liable to pay the amount over again to plaintiff.

**CONTRACTS OF CORPORATIONS UNDER SEVEN YEARS.**—**THE GUARDIANS OF DARTFORD UNION, TRICKETT AND OTHERS.**—(Nov. 14, Before Baron Pollock without a Jury).—This was a reserved for further consideration from the Lewes Assizes. It was an action to recover damages for a breach of contract, and it raised a point as to the contracts of corporations under seven years. In November, 1887, the plaintiffs advertised tenders for Guernsey granite spalls—i.e., blocks broken up for road purposes by the pauper. This advertisement contained the stipulation that the contractors should enter into a contract in the form as the corporation should draw up. The defendants' tender was accepted by the plaintiffs. The contract form forwarded to the defendants for the delivery of the spalls by December 1st was returned signed by the defendants with the word "Weather and other circumstances permitting" inserted in ink. The plaintiffs wrote saying that they had erased the words "and other circumstances" from the contract. Nothing further passed, and the plaintiffs proceeded, on Nov. 26, to affix their common seal to the contract, its thus altered form, and it ran "weather permitting." On December 22, plaintiffs wrote defendants, hurrying the delivery of the spalls which had not then commenced. A good deal of correspondence passed between the parties, but eventually the spalls were not delivered, and the plaintiffs had to buy others at short notice at a higher price. They now (May 10, 1888), brought this action for non-delivery, the damages being agreed at £47 10s. For the plaintiffs it was contended that corporations were in the same position with regard to their contracts when once the common seal was affixed as individuals—"Bateman Mayor, &c., of Ashton-under-Lyne"; "South Yorkshire Railway Company v. Great Northern Railway Company"; further, that corporations were stopped by their conduct in the same way as individuals—"Doe d. Pennington v. Tanier"; "Crook v. Mayor, &c., of Seaford." Under the circumstances it was contended that the plaintiffs could not have denied that they were bound, as that the defendants had acted on the contract, as to bind themselves in the terms set out in the agreement as sealed by plaintiffs as "Stewart v. Eddowes," "Reuss v. Picklesley," in both of which cases a writing was required under the Statute of Frauds. "Reuss v. Picklesley," it was also contended, was conclusive of the present case. "Brogden v. the Metropolitan Railway Company" was also cited. For the defendants it was contended that there was no mutuality, that the plaintiffs were not bound at the time they affixed their seal, and that they could not be bound afterwards. Mr. Baron Pollock delivered judgment on Wednesday in favour of the plaintiffs, saying the question was one of no little nicety and general application. In his opinion there was a binding agreement between the parties at the time the plaintiffs affixed their seal to the proposed term and so made it a contract, for the breach of which they could sue at law. In the case of corporations sealing was equivalent to signature; and the plaintiffs might affix their seal while the other side signed or assented to the alterations. The result would be that the plaintiffs succeeded here. The plea of readiness and willingness to deliver by the defendants and a claim for refusal to accept by the plaintiffs would be open for discussion at a future date, as would be also the question whether the weather was responsible for the delay in delivery. The defendants were to give him and the plaintiffs notice when they intended to appeal, if such a resolution were arrived at.

Darvel Church, N.B., was opened for public worship on Sunday. The church is situated in the centre of Hastings-square, Darvel, and is of Earl English style, from the design of Mr. R. S. Ingham, Kilmarnock. It is faced with freestone from the Giffnock quarries. The accommodation provided in nave, transepts, aisles, and gallery is for 650 persons. In rear of the nave of the church is a classroom for 120 persons, with minister's room, ladies' room, &c. The total cost was £3,500.

Lord Northbrook has built a new church on his estate at Stratton, in memory of his mother. The church was on All Saints' Day consecrated by the Bishop of Winchester. The church replaces a mean modern brick structure, and is of brick with flint facings, and Chilmark stone dressings; it has a tower and shingled spire on north-west side. Mr. T. G. Jackson, M.A., F.S.A., is the architect. Messrs. Parnell and Son, of Rugby, are the contractors; and Mr. R. Evans is the clerk of work.



# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1768.

FRIDAY, NOVEMBER 23, 1888.

## CO-OPERATIVE LIVING.

THERE can be no doubt that our course of living is, and for some time has been, undergoing an enormous change. The "continentalising" of our habits is an apt expression for this change. Travel has done many good things for us, but none better than to alter our set ideas of living. Railways have performed as many social wonders as "Sweet Auburn" has aroused pleasant reflections. People now interchange not only ideas through printing, but customs through travel; and nationalities become transformed, as very rightly they should be transformed, into other channels and other currents than their own. We English people should be infinitely more susceptible, although we are, in fact, but very slowly susceptible, to change than other people; for, in the first place, we being islanders retain more obsolete and isolated ideas; and, secondly, having been cut off from general communication with the rest of the world that is not in our possession, we have very much to learn about the other way that people contrive to live, and live happily but frugally, and without incurring the enormous responsibilities that an Englishman seems to think necessary for securing "position" and the "bubble reputation" among his neighbours and acquaintances—a bastard reputation that he would spend his fortune to retain during his lifetime. At length the experience begotten of travel is beginning to tell upon our mode of living, and that the change is advantageous there can be no manner of doubt. The one problem that people universally have to face is the same one. It is the same in America, in France, and in England. It is simply how to live to the greatest possible advantage with the least possible waste, that is, and the greatest possible enjoyment. For years and years our solution of the problem has been to live in little houses, to pay, and rumble at paying, rates, taxes, repairs, and flapidations; to sustain an enormous proportion of servants; to waste an enormous amount of food and fuel; to live at an enormous rate; to incur enormous responsibilities, and to derive worry and but little happiness from it all. The common sense of English people may be hugely developed; but in the matter of their living it is nowhere. Consider the thousands of acres of land appropriated to dank backyards, called from excessive politeness "gardens"—miserable spots of unfertilised soil, in which sunflowers struggle to hang their heavy heads, the playards and arenas of cats, and the fortunes of the so-called contract "gardeners"; and then consider what co-operation and common sense would do for it all. Ride into London from any of the trunk lines of railway, and take note of the waste ground, the waste roofing, the waste chimneys, the waste bricks and mortar, and air and light, and health and money, and then take note of the dirt and squalor inseparable from such wholesale waste. Is it not truly appalling? Indeed, indeed it would be were there no certain remedy; but there is a remedy, and it is to be found in the universal and practical application of one single principle—Co-operation. Towards that principle we are now, happily, drifting, slowly, perhaps unconsciously, but surely. Let us trace the outward and visible signs.

First and foremost, "the house the castle" doctrine is being driven hard against the wall as it should have been years and years ago. Flats and residential chambers are becoming

general and more adapted to the wants of people, and, what is of far greater importance, people are becoming more adapted to flats. On their first introduction flats were foreign to us, and we did not take to a foreign idea. We had not travelled enough abroad or in wisdom. We preferred our little villas. We did not stop to inquire what the little villa meant. We made our jerry builders our guides, philosophers, and friends, and they took the hint, and became our masters. They built us our little villas, and then retired on their little fortunes. We lived in their little villas, and bade good-bye to frugality and contentment. We became rivals to our neighbours in similar little villas. We kept three servants because our neighbours did, and so on. Waste began, and happiness flew out of the ill-fitting sashes—there was no need to open the window. Of our own free will we squandered half our income on the precious little villa and all its requirements. We had to keep an additional servant to clean the staircase and spare rooms and the front steps. We had to pay for furnishing more rooms than we really required. We had a roof over our heads that had to be kept sound and free from snow. We had a drain under our feet, and that, although it leaked, we did not mind about, for it was out of sight, and we only guessed its existence in our annual doctor's bill. We had tax papers and burst pipes, but those we paid and repaired for the inestimable privilege of living in a jerry villa and castle. The tradesmen slipped down the area and coalesced with our cook, greatly to our disadvantage and to their credit for divining before us the value of co-operation. Our signature was known at the bank better after we entered our castle than ever before. We were not happy. We were not contented. We certainly were not thrifty. But we did as others did. In that lay our misfortune. Now it is our good fortune. The change has been brought about by travel alone, and by the knowledge of what others do, and of how others live. Given a moderate income, how can it best be expended so as to produce the least waste and the greatest happiness? The positive answer may be doubtful, yet it is absolutely certain that we get nearer and nearer to the solution of the problem the more we accept the co-operative principle. The very first thing we all have to do is to have rooms to live in. Is it not more reasonable to suppose that we can have better rooms, more healthy, that is, better built, better sanitated, and at cheaper cost by building several houses in "flats," as they are called, beneath one roof, than to have several separate tenements side by side, each with front doors, front and back yards, separate drainage, separate everything that by combination could be reduced to one? Suppose half a dozen "villas" could be knocked down—scarcely a difficult supposition—would not the ground they occupy, properly treated, provide infinitely better and healthier accommodation at less cost? Knock the back yards into one piece of ground, and there is a good tennis ground. Instead of half-a-dozen leaky drains there would be one good one. Instead of half-a-dozen leaky roofs there would be one good one. Instead of half-a-dozen narrow staircases there would be one wide one. And as it is cheaper to build a big building than a small one, so would the rents of the flats in a big building be both lower to the occupier and more remunerative to the owner, for there would be more made out of the land. That is what is possible. The only things necessary for the universal acceptance of this principle are that we should give up the idea that living in a house gives "position," and that flats should in all cases be built economically, well, and adapted to the requirements and incomes of all people. Builders and designers of flats should learn that people require rooms to sleep in instead of cupboards, and that to overload land is as far removed from

wisdom as to underload it. We are now, whether it be from wisdom—which it should be—or from bitter experience of separate existences—which it may be—fully prepared to change the habit of our living and to accept the co-operative system of dwelling exemplified by flats; and all that remains to complete the alteration of our national life in London is that builders and architects should study common requirements, and produce buildings to meet them. A bad flat is worse than a bad house; but a good flat is better than the best house.

Secondly, we may trace the alteration in our mode of living by the extraordinary increase in the number of clubs and restaurants. Living in flats begets what is called the Continental habit of "dining out." The "Continental habit" is right. The cost of living is materially reduced from the old habit of keeping many servants and burning much fuel and causing many fogs just to cook the evening dinner. The co-operative principle comes in quite as much in eating as in housing. It must be cheaper to dine at a place where the cooking is done for many than to dine at home where the cooking is done for few. Over and above the legitimate profits of the restaurant proprietor there must be a saving, and the increase of restaurants must either prove that, or that we have more money to spend in luxuries. But it is asserted that at the present time the average income has been slightly raised and the high one reduced—in other words, that there are more people of small incomes and fewer people of large—and it would certainly seem that we are at length becoming wiser, and are expending our money to greater advantage—the secret of all living and contentment and happiness.

Whether we shall develop this co-operative principle still further—and it is capable of unlimited development—remains to be seen; but that we are slowly and surely moving towards it is certain, and a matter of infinite congratulation and full worthy of note.

LEWEN SHARP.

## INLAND NAVIGATION.—II.

THE managers of canal traffic have not at present a fair opportunity of competing with the managers of railway traffic, because of the defective engineering works on some of the canals which form connecting portions of through routes. With improvements made in these parts a better opportunity would be given to canals in the transit of heavy goods which barely pay a railway company to carry with the speed which is necessary to clear them out of the way of other and more important business, but which is not necessary for the goods themselves, for in most cases of transit of heavy goods and raw materials the senders and receivers can easily accommodate their business to the time necessary for canal transport; and they would, indeed, be relieved in doing so of much inconvenience which they suffer under the present system. Already the rivers from the tideway upwards are being improved, so that the desired extension of inland navigation has begun. According to a statement of Mr. A. B. Cotsworth at the Society of Arts on the occasion to which we referred in the BUILDING NEWS of 26th ult., a first step has been taken by the Manchester Ship Canal Company and the Trent Navigation Company, where, in both cases, works are now in progress, and already the rivers Severn, Weaver, Ouse, and Ancholme, as well as the Gloucester and Berkeley Canal and the Aire and Calder Navigation, are improved for craft of from 150 to 200 tons. Every possible economy which engineering skill can devise for increased capacity of waterway by means of long levels, with embankments, tunnels, inclines, lifts, &c., should be effected so as to facilitate the transit of such goods as are specially suitable



for conveyance by water, and by some increase of the rate of travel, which can now be more easily effected than it could have been formerly—say to about double the old rate—an increased amount of traffic would be created which would be at least double the present amount.

According to Mr. F. R. Conder, C.E., who read a paper at the same meeting on "Inland Transport in the 19th Century by Land and Water," few persons anticipated that the railways would have the bad effect they have had on those who lived near the old lines of transit by road and by canal. The canal proprietors, however, stoutly opposed the railway companies on Standing Orders and in the committees on the merits of their Bills in both Houses of Parliament, and the opponents obtained little more concession at the expense of the railway companies than a sufficient height of bridges over canals and roads; but when the railway companies had obtained their Acts they retaliated. They coveted the traffic of the canals, but did not stop to calculate the difference of cost between land and water transport. They were blind to the fact that as the passenger traffic had deserted the highways for the railway, so would the canal traffic, for any goods they could afford to convey by rail as cheaply as the canals could convey it; but the force required to draw a load on a canal at four miles an hour is only half that required to draw an equal load on a railway at 35 miles an hour. The other items of cost—the maintenance of works and of way, the repair of vehicles, and the expenses of watching the line and conducting the traffic, are nearly five times as much by land as by water for an equal load. The outlay of capital for providing accommodation for a given amount of traffic is more than ten times as much by a railway as by a canal, and, had fair-play been allowed, the inland traffic of England would have sorted itself: that which could afford to pay a threefold rate for speed would have sought railway transport, and that which could not afford to pay a freight of which one-half was profit would have continued to go by water, to the great pecuniary advantage of freighters, of the canal owners, and also of the railway owners. But the railway managers had no idea of the physical limits of capacity for transport of either a single or a double line of way, and thought, very erroneously, that they could carry all the trade they could get, and that it would be better to carry a large quantity of heavy traffic at a low profit than not to carry it at all. In this they were of course wrong, and the error continues to this day.

Parliament was idle as a controlling power in the matter; the Government did not make it their duty to study it; and the railway companies were able to obtain command of the canals in such parts of the country as to enable them to divert the inland water traffic to their own lines, the result of which has been interruption to the economical working of railways; and while England has been crippling her industrial power by wasting money on a costly and non-remunerative mode of carrying a heavy traffic by land instead of by water, the Continental nations have been busy in improving the waterways, while we have neglected them. In France, wherever waterways and railways run side by side the development of industry and commerce has been such that the traffic of the waterways has increased;—they aid one another in the performance of their proper functions, the railways carrying passengers and costly merchandise, and the rivers and canals the raw materials and heavy goods, for which speed of conveyance is of secondary importance. The attempts which have been made in Parliament to mediate the quarrel between the railway companies and the canal freighters have failed because they were not based on any

accurate knowledge of the subject. While each party has been anxious to obtain an advantage over the other, the Government has been unable to exert any intelligent influence on the debates, from its ignorance of the actual cost of any particular traffic. The statesmen of other countries have patiently ascertained the controlling laws which regulate inland transport, and legislation has followed the dictates of reason. The information conveyed to the Government in France by the engineers of the Ponts et Chaussées has long ago exploded the idea that there is any real rivalry between railways and canals. Each of them has its appropriate work. One-third of a penny per ton per mile will pay for transport on canals of adequate section and volume of traffic, either in France, in Germany, in Belgium, or in England, and this price includes not only a fair interest on the capital, but also provision for a sinking fund, which, within a determinable time, will render these inland waterways the property of the nation, to be used free of charge except the cost of maintenance of the works and attendance on the locks, which is but a small item.

But without going so far as to assume that canal traffic may be carried on free of toll, there is a plain mathematical reason for the economy which the French engineers have practically found in the double service, by land for speed and by water for cheapness. The prosperity of our great towns, Birmingham, Manchester, Leeds, and most of the inland centres of industrial production, began in the use of inland waterways. On the introduction of railways, the convenience afforded by the greater speed, and the obstruction thrown in the way of the canals, transferred a large amount of heavy traffic from the one to the other; but the manufacturers did not anticipate a close contest with the foreigner in the art of production, nor did the railway managers understand the law of the limits of capacity of railways for transport. Meantime, however, the manufacturers and merchants of France, Belgium, Holland, and Germany steadily maintained and improved their inland waterways; and the result is seen in their being able to carry goods at a much less cost per ton per mile than we can, and accordingly to offer goods in the various markets of the world at prices which we cannot compete with, as long as the present system of transit continues; and the result is shown in another way, in that some of the chief industrial establishments of England have already left their own neighbourhoods and established themselves where water carriage is available.

And yet we have existing waterways which, if improved, would save all such establishments from the necessity of removal. There are four principal connected systems of waterway, linking together the estuaries of the Thames, the Mersey, the Humber, and the Severn, with branches connecting the chief inland towns with these seaport termini. The four great estuaries which are thus connected by nearly 2,700 miles of waterway are also connected by seven great railway systems, the aggregate length of which, in 1882, was about 7,400 miles. It looks, therefore, on the face of it, as if goods of all sorts ought to be transported as easily in England as anywhere else. But the existing canals were made for local conveniences, and require uniting and making more uniform in capacity. Some of the locks are only 7ft. wide, while others are 14ft., and both are of insufficient depth for any increase of speed. The question of the rate at which boats and barges should travel on improved canals depends on the cross-sectional area of the waterway in its relation to that of the vessel and the means of propulsion; and it depends not only on the sectional area of the canal, but on its depth in relation to that

area. There are, of course, many things to be considered before determining upon the best dimensions for improved canals; there are none, however, with which English engineers are not already well acquainted.

But whatever be the details, there is one thing required which may prove to be a great obstacle to anything being done—viz., a strip of land alongside most of the canals, for widening, and, as Mr. Lester said, who read a paper on the "History of Canals and Railways," the owners of land are insatiable in their demands when any portion of it is wanted for public works, notwithstanding that the value of the remainder may be vastly increased by the making of the intended works. Land is not like any other commodity: on its being opened out depends the future prosperity of a locality or country.

We have already mentioned the Aire and Calder rivers, and the Trent, the one being an improved navigation already accomplished, and the other in progress. On the capabilities of another river, the Severn, Mr. Henry John Marten read a paper. He is the engineer to the Severn Commissioners. The river is canalised, and rendered navigable from Gloucester to Stourport, a distance of 42 miles. The depth of water is nowhere less than 6ft., and vessels of 150 tons have navigated the whole distance; but although the minimum depth of water over the shoals is 6ft., the depth over the sills of the locks between Gloucester and Worcester is 9ft., and out of the whole length of 42 miles of canalised river, 30 miles are more than 9ft. deep, the remaining portion of 12 miles being 7ft. 8in. at low summer level. The present traffic on the Severn is about 1,000 tons a day. Its principal traffic feeders are the Gloucester and Berkeley Canal, the Worcester and Birmingham canal, the Droitwich canal, and the Staffordshire and Worcestershire canal. Above Stourport the Severn remains unimproved, so that only under favourable circumstances, and with a fair amount of freshet in the river, is it possible to move traffic, which is principally carried on in barges and boats towed by steam power. The average number of boats attached to one tug is from 10 to 12—a fleet.

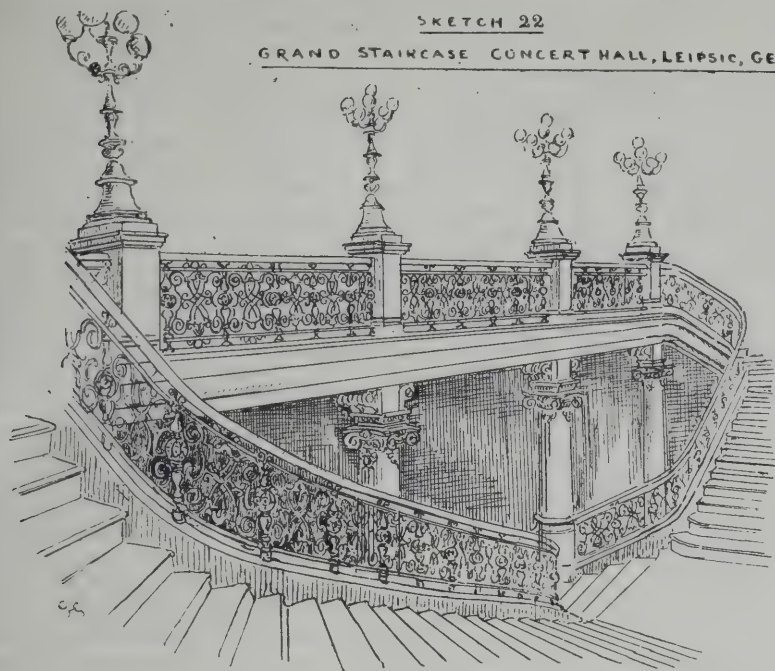
#### HALLS AND STAIRCASES.—IX.

IN our last article we noticed a few examples of staircase halls in which the stairs, centre and lateral branch flights, were surrounded with arcaded galleries or open corridors—a type of arrangement appropriate for buildings of a public or palatial character. The square or rectangular hall sometimes admits of being vaulted or divided into vaulting compartments by columns or shafted pillars so disposed as to make them stair newels, or to divide the flights. A noble Italian example of this kind is the staircase of the Palazzo Braschi, Rome, illustrated by Mr. T. P. Marwick, A.R.I.B.A., in his interesting and clever prize essay on "Staircases," and reproduced in this journal of August 1, 1884. In this instance the rectangular walls inclosing the flights is a square, divided by columns (16 in all) into three compartments each way, the outer or surrounding ones are occupied by the stair-flights. The columns of red granite with Ionic capitals carry arches, which are ramped to the flights, the soffits of which are groined and enriched by panels with relief ornament. The circular arches, longitudinal and cross, spring directly from the capitals. The pedestals of the columns stop the balustrades, which are formed of a series of fluted pilasterettes of Doric-like proportions. In Italy the Renaissance revived many of the old Classic forms of staircases, as the palazzo itself is a developed form of the Roman villa with its open peristylum, or cortile in the centre, and the vaulted vestibule or entrance a transmitted form of the atrium. The adoption



SKETCH 22

GRAND STAIRCASE CONCERT HALL, LEIPSI, GERMANY.

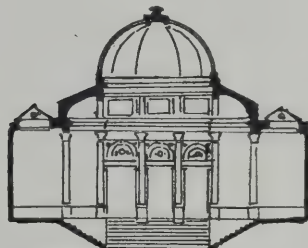


the Italian staircases. The great staircase at the Farnese Palace is a magnificent specimen of scale, measuring 73ft. by 28ft., others have even greater length. Of one or two of these we may probably give samples. A very stately example of an ascending central and two branch flights is to be seen in the Scala dell Palazzo Reale, the Caserta, Naples, in which all the varied effects of marble columns, panelled and sculptured walls, and domical ceilings, are increased by the dimensions and width of the stairs and the noble landing.

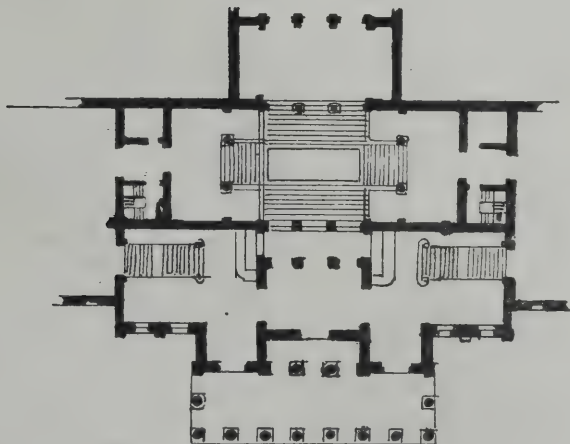
Much variety may be given to a staircase by the arrangement of the branch flights. When a long landing or corridor is to be reached from which several doorways open, as when, for example, a large public hall is placed with its long axis parallel to the street, and is lighted therefrom on one side, it is necessary to economise the area occupied by the stairs. If the staircase hall is made the same length as the assembly room, it is often desirable to reduce its depth. Let us imagine a staircase hall of the shape of a long rectangle, its longer axis at right angles to the entrance. An easy and convenient staircase can be formed by having a central flight branching out or bifurcating from a centre landing into wing flights, and then turning till they reached the first floor. Such an arrangement is shown by the sketch (22) we give of the Grand Staircase of the Concert Hall, Leipsic, Germany, designed by Herren Schmieden, Von Weltzein, and Speer, architects. A gentle turn at each end of the wing flights gains access to a long landing. The columns supporting the latter can be made to produce an agreeable and dignified approach from the entrance vestibule, while the lighting is good. Our sketch does not show the ceiling, which is coved and relieved by cross vaults. This type of stairs appears to be well suited for the requirements of a concert hall or theatre. The plan (Fig. 21) we give shows a novel and somewhat clever central arrangement, designed by Mr. John Taylor for the National Gallery. The two lateral flights agreeably balance each other, and give access to the front suite of galleries. The central wide flight is broken by a spacious landing, and leads direct to the main gallery. Four isolated columns support the domical roof of the vestibule or staircase hall, and the central flights are divided into three bays by the two columns at the entrance to inner vestibule. The arrangement is best shown by the section through the staircase.

Plan 21

NATIONAL GALLERY



•Section through Staircase



Plan of Staircase

### LAND SURVEYING.—XIII.

#### TRIANGULATION AND METHODS OF CALCULATING SIDES.

AS the student can apply the principles of the traverse to a variety of purposes, it is unnecessary to pursue the subject further here. For fixing the position of roads or streets that cannot be surveyed by any system of triangulation or through-lines, for laying down streams or rivers, for obtaining the boundaries of lakes and sheets of water, and also of irregular or curved inclosures and fences, this system of taking angles is admirably adapted. To those who desire to make themselves masters of traverse surveying, the "Treatise on Land Surveying on the Meridian and Perpendicular System," by W. Penman, C.E., is recommended. We now turn once more to the system of surveying, in which triangulation is the principle adopted, with the object of showing how it can be extended to large areas. Let us take an example. A large town is to be surveyed, and it is necessary to lay down a few important points. A base line is selected in a convenient open and level part, either within or outside the town—the more elevated it is the better. The line is accurately measured, and angles are taken at its extremities, or at any convenient points, to

plaster or stucco enrichments. The open newel form, too, is illustrated by many well-known examples. The invention is ascribed to Niccola of Pisa (1278), the campanile of that name having a spiral staircase to the loggia at the top, with a central well, surrounding which are columns at intervals, carrying arches which follow the spiral line to the top. Other noted open newel stair-

cases are found of both square and curvilinear form. Amongst them is the elliptical staircase by F. Borromini, in the Palace Barberini, the open newel having five tiers of coupled columns, the dimensions being 33ft. by 30ft. Of the class of staircases which we have been describing we may notice the fine example in the Scuola di San Rocco at Venice, which measures 46ft. by



any buildings or lofty structures, such as church spires, that are to be plotted with exactness. Having determined their positions by the intersection of the lines drawn through the angles, or by calculation, they can be taken as stations for the detailed survey of the streets, the operations of which we have already described. In Fig. 19 let A B represent a base line measured as we have described. At C, D, E, F, G, H are lofty towers or other structures, the positions of which are necessary to be fixed. These several objects can be seen from the extremities of the base line A and B. From each of these stations take angles to the several objects, noting them in a sketch plan of the town. Then the base line being laid down on paper, and the angles protracted at its extremities, the intersections of the lines of sight from A to C, A to D, A to E, and

Fig 19

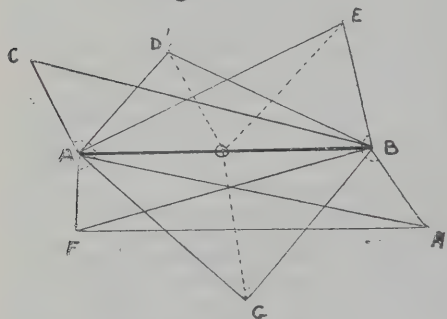


Fig 20

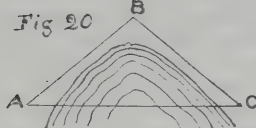
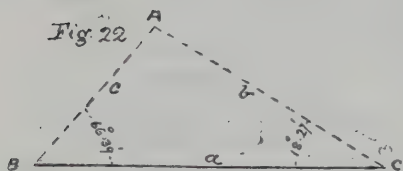


Fig 21



Fig 22



from B to E, B to D, and B to C, &c., determine the position of those objects. The same operation is carried on on the other side of the line to points F, G, and H. The positions being fixed, the lengths of the lines are found, and may be used as the base lines of other triangles. Thus, for example, having found the positions of the objects F and G, the line connecting these points may be made the base of another triangle. In this manner the system can be extended over a large area. As a mode of checking the accuracy of such a survey, fix upon a station, O, in the base line from which one or two of the objects can be seen, and take the angles to them as O D, O E, and O H, shown by dotted lines. These angles are then laid down, and lines drawn through them ought to pass through the intersections of the lines taken from the extremities of the base line. If greater accuracy is required the work of the protractor and straight-edge must be supplemented by calculation. Thus the positions of C, D, and E, and the lengths of the lines between them and the base, can

be calculated by the aid of a simple trigonometrical rule which we shall give presently. A useful check is to measure on the ground the distances between the positions, as between F and G, where it can be done. When the instrument is fixed at any station, angles may be taken also to any other object that can be observed.

In surveying the bend of a river, or in harbour or coast work, two sides of a triangle and the angle included between them can be measured to determine the third side. Thus A B, B C, Fig. 20 can be measured and the angle B taken, from which the distance A C can be found by the following rule: "As the sum of the two given sides is to the difference of those sides, so is the tangent of half the sum of the two unknown angles to the tangent of half their difference." By the aid of logarithms the two unknown angles are found; thence, by another sum, the third side is determined. When the three sides of a triangle are known, or the distances between three objects are measured, as when a triangle can be made to compass an inclosure, the distance to any given object within the triangle, such as a tower, can be found by measuring the angles made from A, B, and C (Fig. 21). By plotting the angles, and drawing the lines of intersection, the point required can be determined, or the internal angles at the centre can be measured. In the filling-up of extensive surveys this problem is of service in finding out the distances of some object or objects which fall within a given triangle.

As an example of practical work, let us suppose we have measured a base line between two stations (see diagram 22), from either of which a church spire or some distant object is visible, but to which no direct measurement can be made. We will call the base line B C, and its length is found to be 1764.3ft. By finding the position of A, a triangle can be laid down, from which other objects may be plotted. The lines *b* and *c* cannot be measured; but the angles A B C and A C B are observed, from which it is possible to plot the triangle by the method of geometrical intersection. For greater accuracy, however, let us suppose it is required to find the length of the side *b*. Since, as we have learnt,  $b = \frac{a \sin B}{\sin A}$ , we proceed

as follows:  $\text{Log. } b = \log. \frac{a \sin B}{\sin A}$ , or  $\log. b = \log. a + \text{L sin. B} - \text{L sin. A}$ .  $A = 180^\circ - B - C$ .

Referring to diagram, let *a* represent the base line measuring 1764.3ft.,  $B = 66^\circ 39'$ , and  $C = 18^\circ 27'$ . By reference to a table of logarithms,  $\log. 1764.3 = 3.2465724$ .

$$\begin{aligned} \text{Log. sin. } 18^\circ 27' &= 9.5003421 \\ \text{,, sin. } 66^\circ 39' &= 9.9628904 \end{aligned}$$

Therefore—

$$3.2465724$$

$$9.9628904$$

$$13.2094628$$

$$9.5003421$$

$$3.7091207 = \log. 5118.2$$

$$\therefore b = 5118.2\text{ft.}$$

Or the solution can be effected by a simple rule as follows: "As the sine of the angle opposite the given side is to the sine of the angle opposite to the required side, so is the given side to the required side." Let the base line measure 2,376ft. To find the side A B we say, as sine A is to sine C :: *a* :: *c*. If we put the angle  $A = 64^\circ 14'$ , that of  $C = 60^\circ 38'$ , then

$$\text{As sine of } A = 64^\circ 14' = 9.9545458$$

$$\text{is to sine } C = 60^\circ 38' = 9.9402847$$

$$\text{So is length BC} = 2376 = 3.3760109$$

$$13.3162956$$

Then, subtracting top line from sum of the second and third lines, we get 3.3617498 = 2,300 = A B.

In nearly every case of triangulation, a

base line and two angles can be measured, so that this mode of calculation is easily applied to the discovery of the other sides.

#### ARCHITECTURAL ASSOCIATION.

THE third ordinary meeting for the present session was held on Friday evening, the President, Mr. H. D. Appleton, in the chair.

#### THE THEORY OF ARCHED STRUCTURES.

A paper dealing with this subject by the ordinary graphical method was read by Mr. Arthur T. Walmisley, M.Inst.C.E. Much of the lecture would be unintelligible without the diagrams by which it was illustrated. Having shown that arches might be divided into the two classes of voussoir and elastic, Mr. Walmisley said he proposed to confine attention to the first-mentioned class, that in which the arch was made up of cemented blocks, as the elastic arch belonged more to the province of civil engineering, whereas the voussoir arch played an important part in nearly all structures designed by an architect. The laws which governed the stability of arches were the same for arches of any shape or form, whether applied to a bridge, vault, dome, or to any other arched structure. As a basis, it was usual to assume that each bed-joint in an arch-ring acted as a hinge about which the voussoirs were free to turn; no allowance was made, therefore, for the adhesion of the mortar in the joints, so that to obtain stability the arch should be in equilibrium throughout. There were many reasons why the adhesion of the mortar should not be considered: first, in some cases mortar between the voussoirs was left out altogether, and sheet-lead substituted; secondly, the mortar or cement might, through carelessness, be inferior in some of the bed-joints; thirdly, an accumulation of dust, and neglect to saturate the surface of the material with water, might prevent proper adhesion; and, fourthly, vibration of the centres might be produced by the deposit of material, or movement might be caused by the varied positions of the loads as the work advanced up the haunches. In arches there were three different causes of failure: (1) The arch might not be in equilibrium, and might collapse by altering its form; (2) the stones might be crushed; (3) the voussoirs might slide on their bed-joints. The curve of equilibrium being an imaginary line representing the centre of pressure throughout the arch (supposing that the material were strong enough to resist crushing), the whole of the arch-ring might be removed except that portion immediately around the curve, and the arch would still remain perfectly stable. The curve of equilibrium changed its form for every alteration of load, except when all the weights were altered in the same ratio, in which case the load could be augmented or diminished, and the same curve maintained. One of the conditions usually adopted with regard to the curve of the equilibrium was that it should everywhere be within the middle third of the arch-ring—i.e., if the depth of the arch was divided into three equal parts, forming concentric rings, the curve should everywhere be contained in the middle ring. That was because the pressures had to be so distributed that no tensile stress would be set up. It therefore became a question how far the line of pressure might deviate from the neutral axis of the arch without a tensile stress being produced. The stones in masonry being elastic, the compression of particles was in proportion to the weight supported; and when the centre of pressure was removed one-sixth of the length of the bed-joint from the centre, the edge of the stone furthest from the load was relieved from pressure, and became just on the verge of tension. When the curve of the equilibrium or curve of pressure was anywhere within one-sixth of the length of the bed-joint from the neutral axis of the arch upon either side, it would be in the middle third, and no tension would be produced. As the curve of equilibrium approached the edges of the arch-ring, tension was produced, which gradually increased until the curve passed outside the arch-ring, causing it to collapse, but practically the arch collapsed much sooner from the crushing of the material. Where the curve rose above the extrados of the voussoirs the arch would sink, and where the curve passed below the soffit the arch would



rise. An infinite number of curves of equilibrium could be drawn for the same loading, depending upon the rise given to the curve. The selection of the true curve required some preliminary consideration, and might be determined on the basis of Moseley's principle of least resistance, as it was evident that the best curve to select was that which produced the least horizontal thrust—i.e., the one possessing the greatest rise and least span. As the middle third had already been fixed for the limit of the curve, the greatest rise given to the curve must be the outside limit of the middle third, and the least span the inside limit of the middle third. In selecting the curve, it might be found that a curve which touched the middle third at the crown and springing would be outside the limit at some other point, and it might be brought everywhere within the limit by slightly moving the crown and springing further inside the limit. In that case that curve which fell everywhere within the limit, and which approached nearest to the limit both at the crown and the springing, would be the curve to be selected. To approximately determine the depth of the arch-ring at the crown, the empirical formulæ founded by Rankine on the dimensions of good existing work could be applied, viz.:

Depth of keystone for a single arch in feet

$$= \sqrt{(12 \times \text{radius at crown})}.$$

Depth of keystone for an arch of a series in feet

$$= \sqrt{(17 \times \text{radius at crown})}.$$

The depth of an arch-ring did not depend upon the crushing strength of the material so much as upon the curve of equilibrium, which usually required wide limits to provide for the necessary stability, and thus gave an area many times greater than was required to resist direct crushing—in practice the proportion varied between 3 and 70, but the above formulæ by Rankine were based upon examples varying from 20 to 40. Having approximately designed an arch, the curve of equilibrium could be drawn; but should the required conditions not be satisfied, the design would require modification, either by increasing the depth of the arch-ring, altering the rise, or altering the loads on the arch. To construct the curve of equilibrium the horizontal axis of the arch should be divided into a convenient number of parts, and the vertical weight calculated for the load on each division, including the weight of the arch. Through the centres of these divisions lines should be drawn representing the centres of effort of the load. The position of the centre of gravity of the whole of the loads on the half-arch was obtained by taking moments round the point in the springing selected for the curve of equilibrium to pass through—that was by multiplying each weight in the half-arch by its horizontal distance from this point in the springing, and dividing the sum of these products by the sum of the loads, thus obtaining the horizontal distance from the springing-point round which moments were taken. For arches having symmetrical loads upon each side of the centre it was only necessary to determine the curve for half the arch, as both sides would give the same result. The weight of the arch was usually divided into an even number of parts, but this was not at all necessary, although it simplified the calculation. If the weight were divided into an odd number of parts, one of the parts would be at the crown of the arch, and would require halving before the force diagrams were drawn, as half of it would belong to each side of the arch. If the loads on an arch were not symmetrical, a similar method of obtaining the curve could be adopted; but it was a little more difficult, as the curves on each side would be different, and the thrust at the crown would not be horizontal, thus involving the extra labour of drawing the force diagram for both sides. Another problem which sometimes occurred in practice was the consideration of an arch acted upon by oblique pressure in which the horizontal thrust was not constant throughout, as in the case of an arch acted upon by vertical pressure, but changed from point to point. In this case each load had to be resolved both vertically and horizontally before it would be properly determined; but as these lines of force did not in this case coincide with the vertical

ordinates, care should be taken, in dealing with the problem by the graphical method, not to draw the curve between the verticals, but between the oblique lines. Passing on to still more complex examples, the lecturer proceeded to explain the application of the theory to the dome, showing that where such structure was secured by a chain passing round it as a belt, the curve of equilibrium would not commence at the springing of the dome, but at some distance above it, the position depending on that of the chain. Dealing lastly with a buttressed arch, such as the chancel arch of a church, Mr. Walmisley referred to the risk of failure in such a structure arising from the third cause he had mentioned—the sliding of the stones at the bed-joint. This angle of friction—that was, the limiting angle at which a pressure might be applied to a stone without its sliding on the stone beneath—varied, he reminded his hearers, from  $31^{\circ}$  to  $35^{\circ}$  with the normal to the joint, and if either of the resultants made a greater angle with the normal, there would be a danger of the stones sliding. The coefficient of friction was the tangent of the angle of friction, and for masonry was known to have a value of from  $\frac{1}{6}$  to  $\frac{1}{7}$ . In some text-books we were furnished with the angles, and in others with the coefficients; but it was a matter of indifference whether we had the angle of friction or the coefficient for any particular material, as we could derive the one from the other.

At the close of the lecture a short discussion followed, in which Messrs. H. Lovegrove, Percy Hunter, S. Beale, and Owen Fleming took part, and a hearty vote of thanks was accorded to Mr. Walmisley.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE second ordinary meeting for business was held on Monday evening last, Mr. Arthur Blomfield, A.R.A., Vice-President, in the chair. The following architects were duly elected members:—As Fellows: Ralph Selden Wornum, 26, Bedford-square, W.C.; Alfred Atkins, Wanganui, New Zealand; Alfred Burr, 10A, Queen-square, Bloomsbury, W.C.; Casper Purdon Clarke, C.I.E., 36, Bath-road, Chiswick, W.; Samuel Taylor Smith, 110, King-street, Manchester; Alfred Hessel Tiltman, Associate, 70, Torrington-square, W.C.; Reuben Castle, Cleckheaton, Yorkshire; Henry George Brace, Associate, Boscombe, Melford-road, Lordship-lane, S.E.; Charles Harrison Townsend, 29, Great George-street, Westminster, S.W.; Albert William Smith, County Surveyor's Office, and 41, Lower Fant-road, Maidstone, Kent; Harry Wilkinson Moore, Associate, 6, Beaumont-street, Oxford; William Hale, Birmingham; Henry John Wadding, Associate, Lambe-buildings, Temple, E.C.; Edmund Kirby, Associate, President of the Liverpool Architectural Society, 5, Cook-street, Liverpool. As Associates: Alan Cameron Walker, 20, Barrack-street, Hobart, Tasmania; Alfred Christie Smart, Kew, Melbourne, Australia; Edward Percy Hinde, Central-buildings, North John-street, Liverpool; Edward Albert Jollye, 3, John-street, Bedford-row, W.C.; Michael Francis Cavanagh, Adelaide, South Australia.—Mr. T. Searancke Archer asked a question relative to the inquiry held in connection with the Metropolitan Board of Works, and desired to learn what the Council of the Institute had resolved with regard to those members of the R.I.B.A. who had been convicted of malpractice. The Chairman replied that five members had been dealt with; one, as already announced by Mr. Waterhouse, R.A., at the opening meeting, had been expelled, and one had resigned his membership, while the other three members had been suitably cautioned and admonished by the Council for the irregular conduct of which the evidence proved them to have been guilty. Mr. Lacy Ridge called attention to the papers entitled (1) "Conservation of Ancient Monuments and Remains," and (2) "Hints to Workmen engaged on the Repairs and Restoration of Ancient Buildings," and asked by whose authority these documents were issued in the name of the Institute, as he for one differed from many of the items of advice contained in them, and thought that other points might well have been improved. The speaker took exception to several minor details, and Mr. Wm. Woodward supported the objec-

tions which had been raised. He referred to his letter on the same subject, published in the BUILDING NEWS for Sept. 14th last, and read some of the criticisms, with which our readers are already familiar, in that communication to our pages. Mr. Woodward specially contended that the advice about draining the site of an old building was unwise for general application; and the plan for removing an ancient wall painting, by destroying the wall behind it, was "positively absurd." The Chairman said that the papers referred to were only renewals of the original "Hints" issued by the Institute about 23 years ago, and which had become out of print. Mr. Ralph Nevill, F.S.A., as a member of the Art Committee, replied at some length to Mr. Ridge, saying that the "Hints to Workmen" were those used by Sir Gilbert Scott, R.A., throughout his long and extensive practice of church restoration, and that all the committee had done was to advise their reissue. With the other paper (No. 1) of advice to promoters of restorations, the committee, which consisted of men specially familiar with this branch of work, had gone over each clause line by line, and the council had also carefully done the same so as to bring the "advice" generally up to date. He contended that Mr. Ridge had unfairly quoted items without the context. Mr. Ewan Christian, F.S.A., said that he knew personally the great value of the papers to which exception had been taken, and, having had much to do with their revision, was prepared to answer for their accuracy. The speaker alluded to the objections raised by Messrs. Woodward and Ridge, and said that although the hints were arranged under the heads of trades, after the fashion of a specification, it was intended rather as a classification of the suggestions than an instruction that certain workmen should do this or that. The foreman of the works necessarily would be responsible to the architect in this matter, as was the case with the specification. Mr. McVicar Anderson, hon. sec., drew attention to the fact that these hints were initiated during the presidencies of Prof. Donaldson and Mr. Beresford Hope, at the instance of Messrs. G. E. Street, Eden Nesfield, J. L. Pearson, Sir Geo. Gilbert Scott, Professors Lewis and Roger Smith, and that the late Mr. Benj. Ferrey had carefully revised them also, so that some of the best authorities on restoration work had been engaged more or less intimately on the preparation of these papers of advice, about which so much had been said. He thought Mr. Lacy Ridge was nothing if not critical, and while possibly in items of detail differences of opinion would necessarily exist about advice of this kind, it must be generally acknowledged that the papers were both sound and useful. Mr. Hayward and others spoke, and the meeting terminated.

#### AN EXHIBITION OF COTMAN'S DRAWINGS.

THE Burlington Fine Arts Club have this week opened in Savile-row a well-chosen and representative collection of the water-colours and black-and-white studies for which John Sell Cotman was famous. Cotman, the son of a well-to-do Norwich silk mercer in Cockey-lane, was of so artistic a nature that his father's intention of making a haberdasher of him was given up, and consequently, at the age of 16, the ambitious youth came up to London. Two years later he exhibited at the Royal Academy. At 27 he married Anne Miles, daughter of a farmer of Felbrigg, near Cromer, and settled in Norwich, where he conducted drawing classes. In this he was not very successful in respect to anything like an ample income from his labours; but, notwithstanding, he did exquisite work. In 1834 he was elected drawing-master to King's College, London, which insured him "a fair salary." Cotman now became comparatively prosperous, and was elected an honorary member of the Royal Institute of British Architects in 1836. He died in 1842. Mr. Frederick Wedmore has written an admirable review of his works in the Catalogue published with the present exhibition, a fitting tribute to one whose poetic suggestiveness, with so seemingly easy a command of the medium he worked in, has only been reached by a few. Cotman's engraved works include, "Etchings by John Sell Cot-



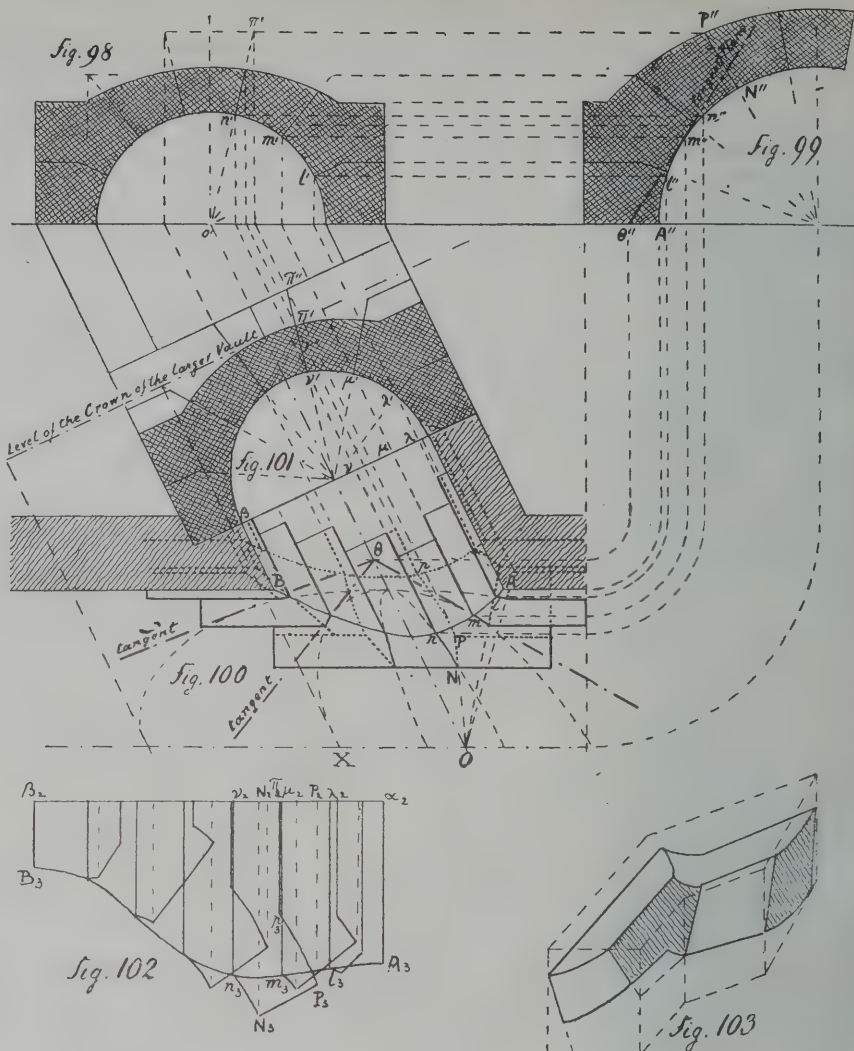
man" (1811); "Engravings of the Sepulchral Brasses of Norfolk and Suffolk" (1819); "A Narrative of the Great Festival at Yarmouth, 1814," on the occasion of the fall of Napoleon; "Specimens of Norman and Gothic Architecture of Norfolk" (1816-18); "Antiquities of St. Mary's Chapel, Stourbridge" (1819); and several other volumes of etchings, in conjunction with Dawson, Turner, and Thomas Rickman, were brought out by him. "The Architectural Antiquities of Normandy" saw the light in 1822. The present gathering of his drawings includes a goodly number of those which were shown last summer at Norwich under the auspices of the Norwich Art Circle, the best of the Norwich works being here represented. "Byland Abbey" (No. 2) is a lovely specimen of liquid effects in pale tints, showing the old ruin of the church rising in the centre of the picture, with the hills beyond and stream in the foreground. No. 8, "Duncombe Park, Yorkshire," furnishes the title for a study of trees in the same graceful and charming style of Cotman's earlier manner. "Durham Castle and Cathedral" (No. 4), seen at sunset over the rushing river spanned by the well-known bridge in the centre of the picture, is a favourite subject, boldly painted against the light with a remarkable effect of aerial subtilty clear and defined. The flint and stone built tower of the "North Gate, Great Yarmouth" (No. 6), is characteristic of Norfolk work, and so is the sketch of "Binham Abbey," though No. 15 of an unnamed circular church tower, evidently built of flint but tinted as if in stone ashlar, gives the idea of a fancy study. "Norwich Market Place in 1805," with St. Peter Mancroft in the mid-distance, is a fine large busy scene, showing the old houses of the last century which once stood round the square. The "Cleve Tomb in Blickling Church" has not the colour which is here added to it (No. 21), and the pews in the view of "St. Peter Hungate Church, Norwich" (No. 24), are too highly tinted in yellow to be exactly accurate. "The Bishopgate Bridge, Norwich," with St. James's Hill in the distance, is a lovely study, and several bits from the interior of the cathedral are charming instances of Cotman's ability. "The Refectory of Walsingham Abbey," the "Dutch Church, Norwich," and the "Bauchum Chapel," are further specimens. Of his knowledge of shipping and love for the sea there is ample evidence, as, for example, No. 42. Here a lugger in dark shadow on the crest of the waves is sailing in a strong breeze, with two ships at anchor in the distance. Such are the elements of the picture. The beauty of colouring, truthfulness to nature, and "go" are its characteristics. Of Mount St. Michael there are three studies from the approach from Pon-torson. We like No. 77, perhaps, the best. "The Rath Haus, Wiesbaden," with its half-timber upper story, the "Town Hall, Ghent," "An Open Place at Malines," the "Abbatial House of St. Ouen, Rouen," a "Street View in the Tyrol," another in Alençon, showing the triangular porch to the Cathedral there, "The Cathedral, Aix la Chapelle," and the "Gateway of Aumale Abbey, Normandy," are among the foreign sketches or pictures of note. A study of the statue of Charles I. at Charing-Cross, and a small Indian-ink drawing of the brick-built porch of the Free School, Thetford, please as greatly. The collection affords a genuine treat, not to be missed.

## MASONRY AND STONE-CUTTING.\*

By LAWRENCE HARVEY.

### SEVENTEENTH LESSON.

**GROIN FORMED BY THE INTERSECTION OF A SKEW LUNETTE IN A BARREL-VAULT.**—In engineering works for covering watercourses, the tunnels bringing affluents into the main course must enter the main vault in a skew direction, and not square. Let  $o'O$  be the direction of such a vaulted sub-way constructed in stone (Fig. 100). If, as in our drawing, the face of the lunette (Fig. 98) be skew with its direction, and, for appearance sake, be made semi-circular, with joints radiating from the centre, then the right section (Fig. 101) will be an ellipse, and the joints will not be normal to the surface of the vault. We may, on the contrary, assume that



the right section is circular, and then the outside face of the arch will be elliptical. Whichever alternative be assumed, it must be remembered that the development of the surface of the vault can only be found by means of the right section.

The division of both vaults in arch stones will be done as in the case when the vaults met at right angles; the groin will again be found by cutting both vaults by a series of horizontal planes, such as  $l'l'$ ,  $m'm'$ ,  $n'n'$  (Figs. 98, 99), each of which will cut both vaults along straight lines, the intersection of which will give the points  $l$ ,  $m$ ,  $n$  of the groin. The tangents to the curve of the groin on plan are found by exactly the same methods as when the vaults meet at right angles, either by the method of the plane of the normals, or by the method of the intersection of the planes tangent to each of the cylinders.

**Development of the Soffit** (Fig. 102).—Develop the right section (Fig. 101), then make  $a_2 A_2 = \alpha A$ ,  $\lambda_2 l_2 = \lambda l$ ,  $\mu_2 m_2 = \mu m$ ,  $\nu_2 n_2 = \nu n$ ,  $\dots$ ,  $\beta_2 B_2 = \beta B$ . This series of points will give the line of the groin on the developed surface of the soffit. Each division of this development will give us the soffit mould of the respective arch-stones.

In drawing the bed-moulds, the depth of each joint must be taken on the right section (Fig. 101), and not on the face arch (Fig. 98). Thus, in Fig. 102,  $\nu_2 N_2 = \nu' \nu''$  of Fig. 101, and  $\nu_2 P_2 = \nu' \pi'$ ,  $\nu_2 \pi_2 = \nu' \pi''$ . The lengths (Fig. 102)  $N_2 N_3$ ,  $P_2 P_3$ ,  $\pi_2 \pi_3$ , are taken from the plan (Fig. 100) equal to the distances of the points  $N$ ,  $P$ ,  $\pi$ , from the line  $\alpha\beta$ . The curves  $N_2 N_3$ ,  $P_2 P_3$  formed by the intersection of the bed with the soffit and extrados of the larger vault are found exactly as in the case of the ordinary Welsh groin (Lesson 16); they are again portions of ellipses, but of which we have conjugate diameters such as  $Oo$  and  $Ox$ , not axes. It is observed that the ellipses formed by the intersections of the beds with the soffit of the vault have all got the one conjugate diameter  $Oo$  in common, and that tangents,

taken on points where lines parallel to the other conjugate diameter, cut the ellipses, will meet in one point, such as  $\theta$ , on the diameter; for  $\theta$  will be in every case given by the intersection of the horizontal trace of plane  $m'\theta''$  (Fig. 99), tangent to the larger cylinder with the centre line of the smaller vault, which is the horizontal trace of all the planes of the bed-joints.

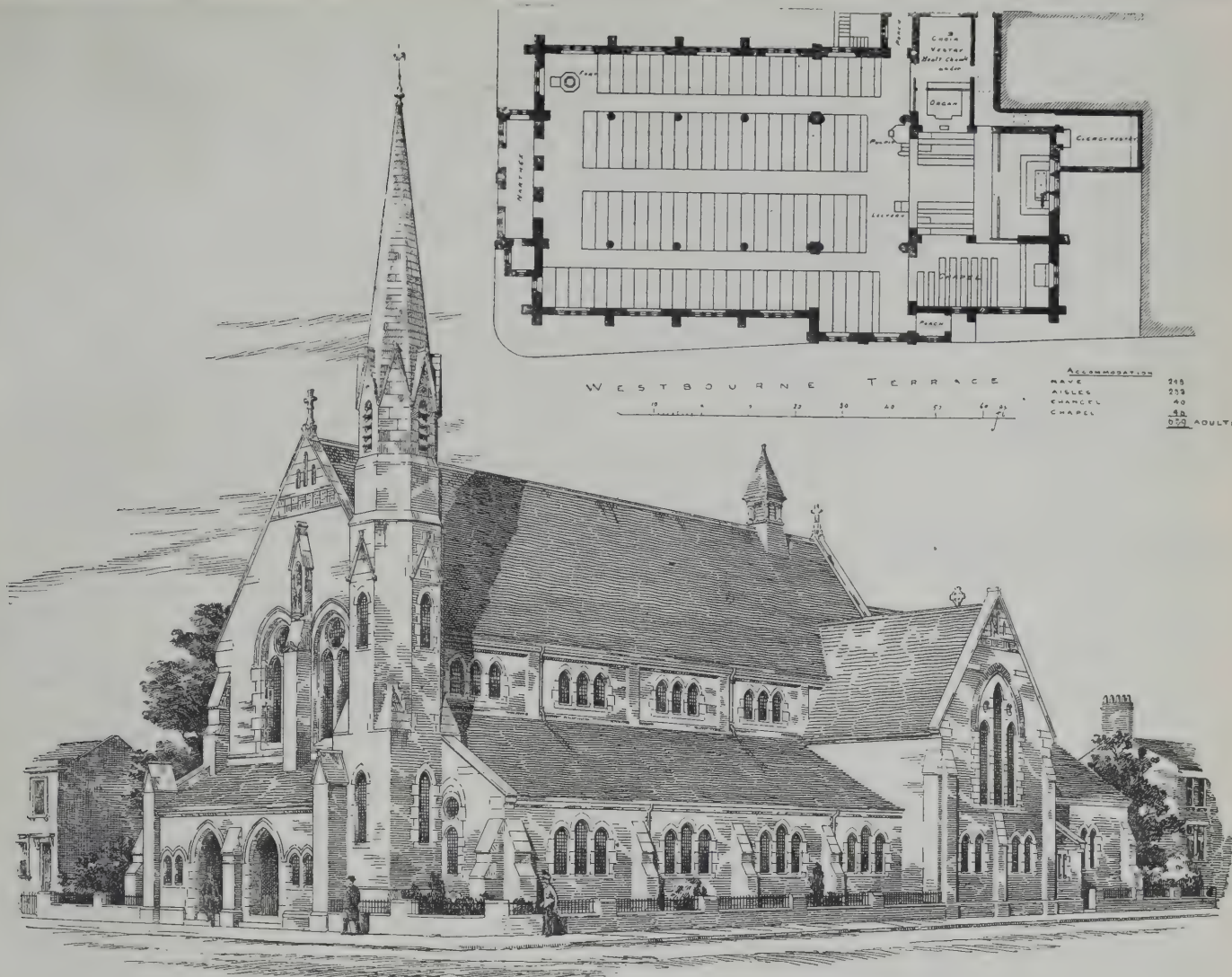
In working the stones (Fig. 103) the face mould must be taken from the square section (Fig. 101). We begin by producing a prism, the base of which is equal to the plan of the stone, and the height of which is equal to the difference of level of the highest and lowest points, such as  $\mu'$  and  $\pi''$  (Fig. 101). The working of the stone is then completed by the same methods as in working the stone of the Welsh groin when the vaults met at right angles, the only difference being that the sides of the L-shaped prism are not at right angles.

## THE HISTORY OF HAMPTON COURT PALACE.\*

THE second volume of Mr. Law's "History of Hampton Court Palace" fairly sustains the interest which the first volume has aroused. We should have liked to have seen a few more carefully executed engravings of the buildings themselves, which, from an architectural point of view, form a group of Tudor and Stuart examples nowhere else to be found in such completeness. Mr. Law's new volume treats of the Stuart period of the eventful history of Hampton Court—a period replete with associations, and embracing a narrative of the events that occurred at the palace from the commencement of the reign of James I. to the end of that of James II. A third volume is promised, embracing the last hundred years of the history of the palace, bringing the work to

\* The History of Hampton Court Palace. Vol. II., Stuart Times. By ERNEST LAW, B.A. London: George Bell and Sons, York-street, Covent-garden.





ST. HILDA'S, MILLFIELD, SUNDERLAND.

a close. The most eventful history of Hampton Court is contained in the first volume, which deals with Tudor times, and includes the stirring incidents which occurred there during the reigns of Henry VIII. and Elizabeth. We generally, indeed, associate all that is of popular interest with those personages and the illustrious Wolsey. Under James I. a new régime commences. When he came to reside at the Palace from Windsor Castle it was in excellent order, and he here ordered a grand masque at Christmas in 1603. One of his first actions was to confer the dignity of knighthood on all persons who had £40 a year in land or upwards. Over three hundred persons availed themselves of the opportunity, were presented, and paid the fees—a necessary part of the programme, as His Majesty was in want of funds. Later on to replenish his coffers he founded the order of baronets, who each paid a fee of £1,000 on creation, in addition, to defend and ameliorate the condition of the province of Ulster, and aid towards the building of churches, towns, and castles—a condition for the honour conferred, which, as the author says, would startle our modern baronets. Not content with lavishing these honours, he created in the Great Hall at Hampton eleven peers, a hundred more peerages being conferred in his reign. The author's interesting account of the Court festivities on the first Christmas after the accession to the throne, on which occasion a grand masque written by Samuel Daniel was presented, gives us some idea of the entertainment, which was an improvement on the mumming and revels of the earlier Tudors. The masque of the "Vision of the Twelve Goddesses" partook more of the dramatic representation; Inigo Jones designed the scenery and appliances, and the ladies who took the parts of the goddesses are given by Mr. Law, who discovered their names in a curious copy of the

first edition of the masque preserved in the British Museum. William Shakespeare was foremost among the king's company of comedians, and no doubt was one of the visitors at these Christmas revels. It is surmised that the old pantry behind the screens at the end of hall was set apart as a "tyranging-room" or green-room for the queen and her ladies, and the Great Watching Chamber at the upper end of hall was used for rehearsals. We can only imagine what the Great Hall was like when thronged with a courtly crowd at such an occasion, and we can dimly picture to ourselves the splendid pageants that must have taken place within its walls during Elizabeth's reign. Mr. Law's researches into records and contemporary annals furnish us with materials for the colouring of such a picture. Even Elizabeth's wardrobes at the Tower were put under contribution for this Christmas masque. The hall, with its tapestries and glass, must have furnished a brilliant spectacle with its crowd of courtiers and gorgeously-dressed ladies and torch-bearers, a scene which the graphic pen of the author depicts. The Conference between the Church of England and the Puritans forms the subject of another chapter, and a scene of a different kind. The author has here freely used Barlow's work on the Conference, and Strypes' Whitgift, and gives an interesting narrative of the pedantic vanity of James, his display of Biblical knowledge, his impatience of the Puritan divines, the insults he showers on them. But we cannot go further. Other chapters narrate the king's fondness for stag hunting, Prince Otto's description of the palace, the Queen Anne of Denmark and her deathbed. Amongst the incidents recorded is the proposed marriage of Buckingham's brother, Sir John Villiers, to Chief Justice Coke's daughter, how the girl was carried off by her mother, Coke's pursuit and capture, and the marriage cere-

mony in the chapel. Charles I. often visited the Palace: his dismissal of Henrietta Maria's suite and Buckingham's intrigues form the subject of two chapters. The remonstrance to Charles after his attempt to arrest the Five Members, his flight to Hampton Court, are told with circumstantial detail. The remainder of the narrative describes the Great Rebellion, when the Parliament take possession of the Palace and destroy the altar and sacred pictures; Charles remains here as a prisoner, and his intrigues and escape are all told. The period of the Commonwealth, when the Palace was put up for sale; Cromwell's possession of the Palace, his illness and death; and the subsequent history of the Court under Charles II. and his favourites and unhappy Queen Catherine, form interesting episodes in the history of the Palace. The illustrations, comprising several etchings and copper-plates, are well selected.

#### ST. HILDA'S, MILLFIELD, SUNDERLAND.

**T**HIS church is designed to accommodate about 650 worshippers when completed, according to our illustration; but the present building scheme does not include the western bay of nave, narthex, tower, &c. This omission reduces the accommodation to about 520, and the cost is estimated at about £3,000. It is to be built of brick, with stone dressings, and the roofs covered with plain tiles. Mr. H. T. Graddon, A.R.I.B.A., of the firm of Alexander and Graydon, architects, of Middlesbrough, is the architect, his design having been selected in open competition from 23 designs submitted to the committee.

Dr. R. C. Puckett has resigned the headmastership of the school of art at St. Alban's, after many years' service.



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## ILLUSTRATIONS.

HOTEL PONCE DE LEON, ST. AUGUSTINE, FLORIDA.—  
OLD GABLES AT YPRES.—TWO HISTORIC BEDS, KNOLE  
PARK, KENT.—COFFEE-HOUSE, WINSON GREEN, BIR-  
MINGHAM.—HEATH CONGREGATIONAL SCHOOL CHURCH,  
HALIFAX.—SKETCHES OF DOMESTIC AND ECCLESIA-  
STICAL FURNITURE.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## HOTEL PONCE DE LEON, FLORIDA.

THE vast extent of this building and the originality of its architectural treatment render it of more than ordinary interest. We give a general view, with an interior, of the large dining-room and a plan of the hotel. A detail drawing is also given, showing the main entrance to the great courtyard. Our illustrations are taken from the originals, kindly lent us by the architects, Messrs. Carrere and Hastings, of Bowling-green, New York. Florida, the American Italy, with the Gulf of Mexico on the west and south, while the waters of the Atlantic are tempered by the Gulf Stream, naturally furnishes a health resort of great popularity. Here, at St. Augustine, on a lovely site, has been erected the Hotel Ponce de Leon. The building is constructed of concrete with red terracotta dressings, and is described as a monolith. The materials used were broken shells or coquina deposit from the Anastasia Island (a mile away), and Portland cement, mixed in the proportion of six parts of shell to one of cement, the composition "forming an indestructible mass" of light mother-of-pearl colour, which glitters in the sun. The terracotta dressings are of light salmon-red. The roofs are covered with dark Spanish red tiles, and over the entrance rich faience is used. The loggias overhanging the different façades are of wooden construction. The great court, planted with palms, roses, and vines, is 150ft. square, with a corridor round it. In front of the gateway, with its portcullis on going in, is the main entrance, rich in mosaics and elaborate terracotta of Renaissance detail. To the left and right are the ladies' entrances. The hall takes the form of a rotunda, on one side of which is the great parlour and the billiard rooms; reading rooms, barber's shop, and hotel offices are situated on the other. Facing the entry is the large dining-hall, with the kitchens and offices beyond. The parlour is 104ft. by 53ft., and is divided into five apartments by arches, portières, and screens. We give an interior view of the dining saloon, at the end of which is a music gallery. In the grounds is a cascade formed from a sulphur spring, discovered during the progress of the works. The water thus obtained, "at the rate of ten million gallons of water in twenty-four hours," is used for driving the machinery. The cascade, which is shown on the plan we publish, is 450ft. long, and is constructed after the fashion of the great cascade of St. Cloud, with fountain, statues, stairs, alcoves, and terraces, all of which, like the hotel, are lighted by electricity. In the grounds are a church, parsonage, and Sunday-school. Adjoining the hotel is the Alcazar, which serves for the amusement of the visitors to the hotel, with salt water and sulphur spring baths, club

rooms, tennis grounds, 300 bedrooms as a dependence of the Ponce de Leon, and a grand restaurant. We shall give some illustrations of this other building at an early date, from Mr. Hastings' own drawings. The builders are Messrs. McGuire and McDonald, of St. Augustine; the decorations and frescoes were done by Mr. Geo. W. Maynard, of New York, and Mr. T. Hastings, one of the architects; Mr. Wm. Kennish superintended the concrete construction, and Mr. J. W. Ingle was clerk of the works. The Hanover Portland cement was used, and the terracotta came from Perth Amboy, N.J.

## OLD GABLES AT YPRES.

OF the many interesting towns visited in Belgium I found Ypres the most, from an architectural point of view; for besides possessing a fine cathedral, and a grand cloth hall, "the largest and most beautiful" in Belgium (Fergusson), there are many scraps of interesting Domestic work, of which the sketch given is a fair example; the strange chimney-like brick finials being the characteristic feature. The bricks used in this case are of a grey colour, scarcely so happy as the red. Ypres is extremely dull and quiet, the grass grows in the streets, and so it is a convenient place for sketching, and I should recommend it to those whose tastes are that way inclined.—LEONARD V. HUNT.

## HISTORIC BEDSTEADS, KNOLE PARK, KENT.

THE announcement recently made that in consequence of the terms of the late Lord Sackville's will, most of the fine-art works and old furniture in Knole House, not restricted as heirlooms, are to be sold, has naturally directed attention to that remarkable mansion, and its exceptionally good collection of Elizabethan and James I. specimens of the cabinetmaker's art, for which the place has always been so celebrated. The selfish rule, too, of the late owner, by which visitors of all kinds were entirely excluded from seeing the house and its contents, naturally enough, made many all the more anxious to inspect the building, while more or less inaccurate descriptions of what is there to be seen are to be found in accounts concerning the apartments. We have to-day chosen from the series of photographs taken by Mr. C. Essenhigh Corke, of London-road, Sevenoaks, two views illustrating some of the bedrooms containing the great bedsteads, usually mentioned in all works descriptive of furniture, with similar examples at Hampton Court, Haddon and Hardwick, Montacute, Ashley Hall, Blickling, Penshurst, Hatfield, Derwent Hall, and other mansions. The upper bedstead seen in our plate is in Lady Betty Germaine's Chamber, which contains the Mortlake Tapestry, worked after the picture of Vandeyck, comprising portraits of the artist and Sir Francis Crane, Master of the Tapestry Works. The Venetian Bedroom remains as it was fitted up for the Ambassador Molino, after whom it is named. The toilet table and mirror frame are of silver. Here is a portrait of Catherine II. of Russia in a soldier's red uniform, given by her to Lord Whitworth. The "King's Bed-Chamber," so called because it was furnished as it stands for James I., has a bed like the upper one here illustrated. The silver toilet service used in this room was, however, added in 1743. The walls are hung with fine tapestry, and the bed hangings are of rich needlework, with vases and plumes at the four corners of the tester. The chairs are good examples of their style. Over the fireplace is a picture by Jansen of historical interest, representing the three brothers Coligny, including the admiral murdered on St. Bartholomew's night. The furniture of the Spangled bedroom and dressing-room was presented by James I. to Lionel Cranfield, the Earl of Middlesex. Our lower illustration represents this fine apartment. Knole Park, ranking with Penshurst Place, its near neighbour, and Cobham Hall, is one of the three finest houses in the county of Kent; Ightham, with all its special interest, being a smaller and less pretentious class of dwelling. Leeds Castle, too, can scarcely be compared to it properly. Knole is very extensive, and forms a magnificent range of buildings, surrounding two quadrangular courts; the greater part is Elizabethan, finished in 1605, which date is inscribed on the leaden

waterspouts. This part was built by the first Earl of Dorset; a portion is earlier, built by Archbishop Bouchier, who inclosed the park, and was bequeathed by him to the see of Canterbury in 1486. It was one of the sixteen palaces owned by that see. The late Baron Sackville inherited the place from his mother, Baroness Buckhurst. Knole came into the Sackville family in 1603, when the Earl of Dorset was Lord Treasurer. It was for a short time alienated in the reign of Charles II., and having been then repurchased has remained in the family till now. Cardinal Morton added to the house, and received Henry VII. here, while in 1509 and 1514, Henry VIII. visited Archbishop Warham at Knole. Cranmer is said also to have lived in the mansion, and Queen Elizabeth came to "her house at Knole" in 1573. The building was refitted in 1605-7, and part of the house inhabited, as the family wing has been modernised; the east front, too, has some plaster gables and bay windows, which look like 18th-century work. The entrance is by a gatehouse after the fashion of Penshurst, leading into the outer or "green court." The inner court is paved, and has a colonnade of quaint Jacobean character surmounted by a balustrade with stout newels and ball terminals. On the parapet above is a rococo coat of arms and heavy swags, put up in Georgian Times evidently. The gables of the Elizabethan work are of the usual form employed at that period, and the buildings group very picturesquely, with the clock turret, of indifferent importance, crowning the composition over the main entrance building. Mr. Corke's views include some seven pictures of the exterior, besides about a dozen of the inside of the house. The great hall was re-roofed and fitted up by Lord Buckhurst (the poet). It is 75ft. long by 27ft. wide. At the end is a music gallery of florid Jacobean detail, rich in armorial bearings, illuminated in colour, and the whole is surmounted by great beasts holding shields and a central coat of arms of the Sackvilles. The walls are panelled to the height of the window sills, and the ceiling is ribbed in a geometric pattern and having pendants in scale with the rest. The chimneypiece is of marble, like those at Hardwick, and the grand old fire-dogs from Hever Castle bear the initials of old King Hal and Anne Boleyn. There is a noble antique of Demosthenes or of Pythagoras; a fine copy of Canova's Perseo in the Vatican, and other statuary in this hall worth noting, besides several pictures by Rubens, Kneller, Lawrence, &c. The staircase figures in Nash's "Baronial Mansions," and will be found illustrated in the BUILDING NEWS for August 20, 1886, the year the Architectural Association visited Kent. The late Lord Sackville would not, however, allow the party to see Knole, and so it was left out of the programme. The interesting detail of this staircase is well shown in Mr. Corke's print. The "Cartoon Gallery" contains copies of six of Raffaele's cartoons at Hampton Court, and some splendid furniture as well as statuary. The large marble chimneypiece, too, is a fine one, with silver sconces to the fire-dogs. A similar mantel is in the ball-room, which has wainscoted walls of unusual design crowned by a richly-carved frieze divided by projecting sculptured winged figure brackets and treated with mermaids holding armorial shields, grotesques, &c. The large paintings hung on the walls destroy the effect of this curious old detail, and the ceiling seems large in pattern for the mural treatment. The "Crimson Drawing-room" contains the best pictures in the house, including works by Titian, Raffaele, Holbein, Reynolds, Gainsborough, Teniers, and other masters. The chimneypiece is an odd composition, with bronzed figure-heads to the jambs of the fireplace. The Leicester gallery is panelled and full of pictures. The chapel is of Perpendicular date, built by Archbishop Bouchier, with a good traceried east window. The gable of the chapel forms an important feature of the house when viewed from the east. It stands N. and S. Inside the stalls and screens are interesting, and tapestry hangs on the walls.

## COFFEE TAVERN, BIRMINGHAM.

THE coffee tavern at Winson Green is erected by Mr. James Moffat from designs of Mr. Wm. Doubleday, architect. The materials are Bath stone, Broseley roofing tiles, lead light windows, and walls lined with Minton, Hollins,



and Co.'s tiles, and Adderley Park bricks in half-timbered gables.

#### HEATH CONGREGATIONAL SCHOOL CHURCH.

THE present structure is intended to fulfil the requirements of a Congregational church temporarily, and that of a Sunday-school; but it is proposed to devote the whole of the structure to the latter uses at some future time, when the surrounding district becomes so thickly populated as to warrant the erection of a building for church purposes exclusively. The large room for church purposes is placed on the first-floor level, 78ft. 6in. by 35ft. This is approached from the outside along a raised terrace leading from the public road; there is a central entrance vestibule, 26ft. by 12ft. From each side, on the right and left-hand, staircases ascend to the gallery, and descend to the Sunday-school. The school is approached from the side street, and consists of an assembly-room, 35ft. by 40ft. 6in., and a number of classrooms. In view of the ultimate uses the building is intended to fulfil, the plan is so arranged that the whole area may be divided into classrooms. The building is about to be proceeded with, and the architects are Messrs. Horsfall and Williams, of Halifax.

#### WAYSIDE NOTES.

MY remarks on the Carleton School Board competition were hurriedly made, and I had but skimmed the "Instructions." Nevertheless, they were in no wise hasty or ill-timed. Quite the reverse. On more leisurely perusing this delightful document I find, among other choice paragraphs, that Clause No. 4 stipulates that "the architect whose plans, &c., may be first chosen by the Board, must make such alterations in the same as may be required by the School Board, and at his own cost submit the same for and obtain the approval of the [Education] Department, before he become entitled to the same premium, and failing the approval of the Department being obtained to the plans, &c., so submitted, it shall be competent for the Board either to permit further alterations in such plans, &c., or to decline them and make further selection from those of the other competitors, or to consider the competition void. In any event the Board shall not be liable to any competitor for any payment whatever, either in the nature of premium or expenses of any sort." If this does not "take the biscuit," I should like to know what does? It seems to me that it fairly takes the concrete. Liberal, generous, open-handed School Board for Carleton!

This competition, be it noted, is on the patent, automatic, self-paying principle. The entrance-fee is five shillings! Originally it was intended to be half-a-crown; but the "inaugurators" evidently came to the conclusion that they could put on the screw a little harder, so the two-and-six is scratched out and 5s. inserted in red ink. The fee is to be remitted the same time as designs. Among other anomalies of these curious instructions I find there is a modest request for a little extra work to be done for the £20 premium—just a trifling half-hour's work, the Board evidently think. It is only a separate sketch, specification, and bill of quantities, and estimate for a school-house! Phe—w! It is a matter of some surprise to me that the Board did not incidentally suggest that the architect should include plans, specifications, estimates, and quantities for a moderate-sized villa for each member, a new church for the Carletonites, half-a-dozen cottages or so, and a publichouse to which the Board might adjourn to drink his health.

There are other fine points about this competition; but I am loth to waste space on further criticism. Suffice it to say that the whole thing is beneath contempt, and it is to be hoped that all will so consider it. As a matter of fact, however, we know with what fatuous alacrity the lower strata of architectural competitors respond to these impudent invitations—alas! for the future of competitions. This ought not to be. Nor would it, if the profession had any true unity in its composition. It is all very well to say that, inasmuch as only pupils and office-boys compete, sufficient is done if we treat them with the contempt they

deserve; but those who ought to know better enter for such competitions for the very reason that they anticipate no formidable opposition, and for the sake of a miserable premium will inflict an injury on the interests of the profession which, if not at once visible, is very evident in the long run. If we could by some means prevent the inaugurators of these impudent competitions from receiving by any possibility designs from any person worthy the name of architect, in even its smallest sense, the tone of competitions would surely improve. Although we know exactly the class of competitors in cases such as this at Carleton, there is no doubt that the public are often deceived and imagine that the majority of architects are glad of the chance of a scramble for a £10 or £20 note. But one gets infinitely weary of talking about reform in competitions, and, for the matter of that, about anything concerning the *esprit de corps* of the architectural profession.

A note in the *Athenæum* of last week stated that, during the last few days, the opening in the hoarding in front of the north transept of Westminster Abbey, through which one could see the rose window, has been closed. The writer wants to know whether this is preparatory to the performance of certain surgical operations on the framework of the window. "Out of sight, out of mind," is, I suppose, the motto of those in authority.

Parliament was busy once more last Friday on questions of supply, and the usual amusing, if not instructive, discussion on art and architecture took place. Mr. Mundella must be awarded the palm. There is a boldness about his remarks as to art in general, and a good, sweeping assertion was that ament the total ignorance in matters of science and art of the "hon. gentlemen on the Treasury bench." There is certainly some truth in Mr. Mundella's observation about the South Kensington Museum—viz., that though it has not its equal in Europe, there is not a pot-house in London that has not a better entrance. Mr. Bartley, who always has something to say on such occasions, suggested that the Treasury should apply larger sums to the development of science and art, rather than to the staff at South Kensington—a suggestion savouring of originality, though scarcely lucid—evidently on the *lucus a non lucendo* principle. It is gratifying to reflect that on this occasion there was a conspicuous absence of the usual agitation for reducing the amounts to be devoted to the museums of science and art, excepting that Mr. Labouchere, from force of habit, moved the reduction of the vote of £195,303 for salaries and expenses in connection with the Science and Art Department by the sum of £500. Needless to say, it didn't come off.

It was with the greatest regret that I noticed the death of Colonel Duncan, who so lately used every endeavour to get the Registration Bill through Parliament. It is now some ten years since I was first brought into personal contact with Colonel—then Major—Duncan; and though I have not seen much of him since that occasion, I then had an abundant opportunity of observing the genial, warm-hearted nature of the true British soldier. The fact that the Registration Bill did not pass its first reading in the Commons was no fault of Colonel Duncan's, nor was it owing to any lack of energy and devotion on his part; but to the singularly unfortunate circumstances attending its first reading, and the blind opposition of the Institutes—opposition which will, I hope, be reduced by two-thirds when a second Bill for the architectural profession alone is introduced.

Talking about Registration reminds me that I was button-holed by an amateur architect in the train some weeks back. "By trade" he was a City merchant; but he said he had great feeling for art. I listened silently to his account of a house he designed for a friend in the north of London. The plan appears to have been marked by little originality; but some scope for novelty was found in the height of sills of sitting-room windows, which were over 3ft. or 4ft. above the floor! The "client" appears to have been dissatisfied with the result, and I suggested that perhaps he had

made them a trifle high. It appears that he had tried to "observe" the Gothic style throughout; but in effect could only introduce a staircase window of this order, the rest of the design settling down into a variety of "Renaissance"—I could scarcely comprehend from the description given. There were an abundance of columns, particularly in the interior, where *scagliola* was introduced wholesale, as being a very "noble" material. Some little difficulty occurred in disconnecting the waste of the bath from the drains. The bath-room was on the first floor, and the window appears to have overlooked the drawing-room, which was on the ground floor. Genius, however, triumphs over every obstacle. The idea occurred to our amateur architect to make the break somewhere on the drawing-room flat. But it was not low enough. Another masterly stroke of genius, however, and, Presto! the trick was done. He sunk the drawing-room bodily. And, now, two or three steps lead from the hall to the drawing-room, the flight being placed just under one's nose, in the drawing-room, as one opens the door from the hall! It is strange to reflect that the client who paid 5 per cent was scarcely pleased with this ingenious contrivance.

Passing by Hankey's Mansions a few days ago, I noticed that a good start has been made with the new extensions. They are of very considerable area, and together with the old block form a striking testimony to the success of the "Flat" system in London. Still further extensions, other than those visible, are evidently contemplated. The work is being done very solidly. At present, operations have reached the ground level. There does not appear to be any contract—as we understand the term—in connection with the work—a fact that may have been noticed in more than one big job in London of late. As evidence of the non-existence of a contract, there is no contractor's name on the hoarding, and whoever heard of a job up to ground level without something being "writ large" on the hoarding by the builder, and nowadays, shall I say, by some architects? Moreover, there is a brand-new steam-engine on the works, and a supply of scaffold-poles that but lately must have been noble trees in the forest primæval. Judging by the presence of certain massive cubes of granite, that await setting, I should say that the archaic severity of elevation of the old folly is to be slightly relaxed in the new.

GOTH.

#### ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—At the meeting of this society held on Tuesday evening an address on "The Affiliation of Architectural Students' Societies" was delivered by Mr. Herbert D. Appleton, F.R.I.B.A., the President of the London Architectural Association. He pointed out the desirability of forming a strong bond of union between students of architecture. This could best be done, he thought, by affiliating the students' societies all through the United Kingdom. Such an amalgamation would result in valuable interchanges of such opinions and experience as were calculated to make the students more proficient in their profession.

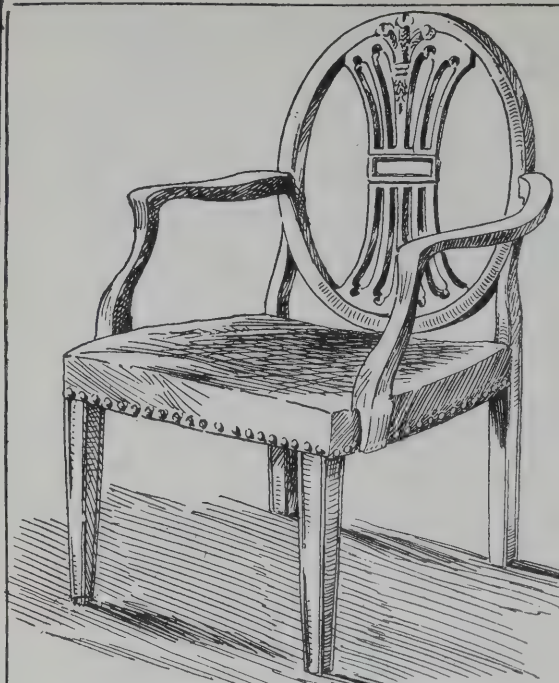
#### CHIPS.

The foundation stone of St. Theodore's Church, Kenfig Hill, was laid on the 19th inst. The contract is let to Mr. John Haines, of Cardiff. The architects are Messrs. Halliday and Anderson, of Cardiff and Llandaff.

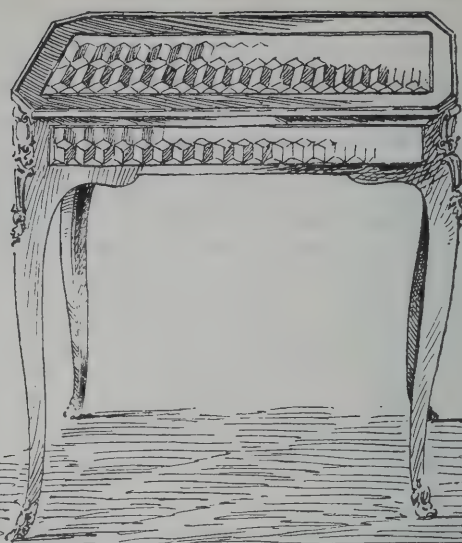
The Princess Christian will open, on Friday, the 7th December, the new studio for the study of the life, library, lecture, and classrooms, which have been added to the Royal Female School of Art, Queen-square, under the superintendence of Mr. Ernest Turner, architect.

The large window at the west end of St. Andrew's Church, Brechin, has been filled with stained glass, by way of memorial to the late Earl and Countess of Dalhousie, by the tenantry and other friends upon the Brechin and Edzell estates. The chief subject, which occupies the whole of the upper portion, is Christ's Sermon on the Mount. Below this, three other pictures illustrate the Beatitudes. The work is from the studio of Messrs. Powell Brothers, of Park-square, Leeds.





CHIPPENDALE ARM CHAIR



MARQUETERIE TABLE



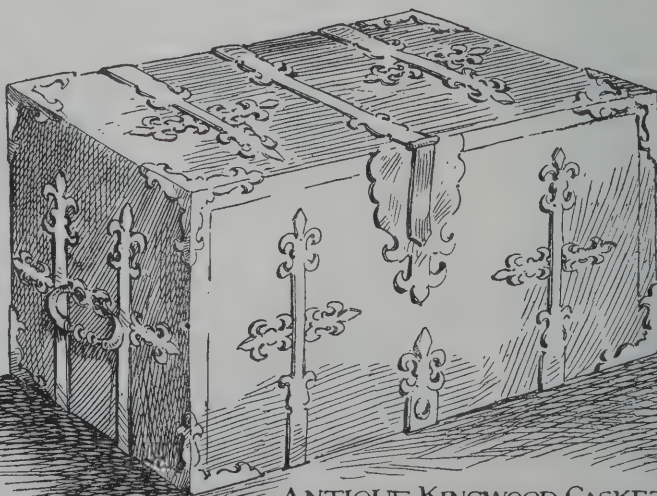
ANTIQUE ITALIAN JEWEL CABINET

AT THE SALE ROOMS

SKETCHES OF FURNITURE &amp;c

AT MESS<sup>rs</sup> PHILLIP SON & NEALE'S ROOMS

MARQUETERIE COMMUNE



ANTIQUE KINGWOOD CASKET







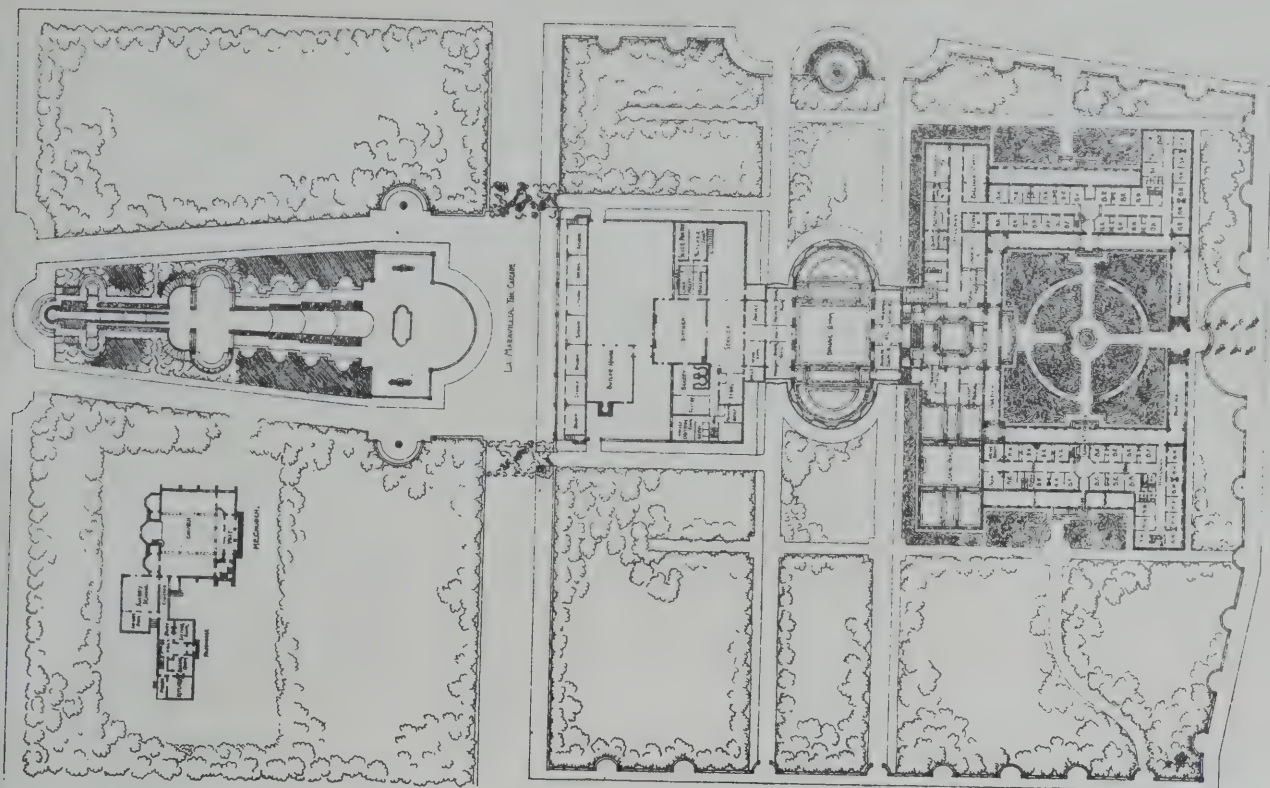


HOTEL PONCE DE LEON—THE DINING ROOM



HOTEL PONCE DE LEON—ST AUGUSTINE





PLANS OF: HOTEL: PONCE: DE: LEON: CASCADE: AND: MECHURCA:







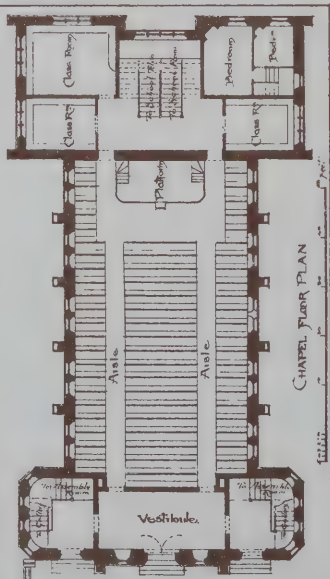






THE BUILDING DEWS, NOV. 23, 1886.

HEATH CONGREGATIONAL SCHOOL CHURCH  
HALIFAX.  
*Morgan & Williams Architects*











*Carrie Hastings archts.*

ENTRANCE TO THE COURT-YARD OF THE HOTEL PONCE DE LEON



Nov. 23. 1888.















OLD GABLES AT YPRES · BELGIUM · DRAWN BY L.V. HUNT

"PHOTO-TINT" BY JAMES AKERMAN, 6, QUEEN SQUARE, LONDON, W.C.





"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

TWO · HISTORIC · BEDS · KNOLE · PARK · KENT

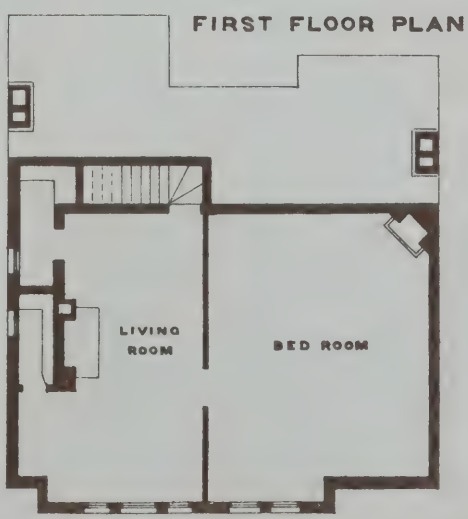
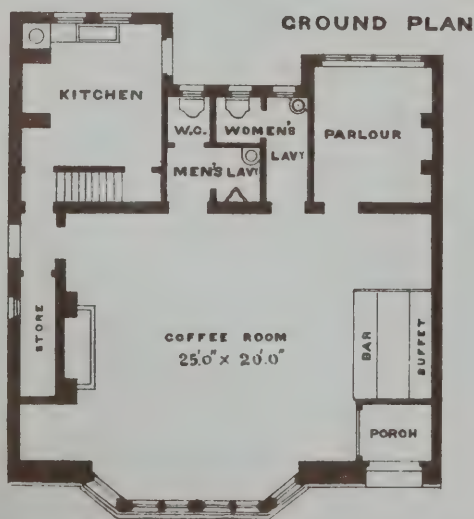








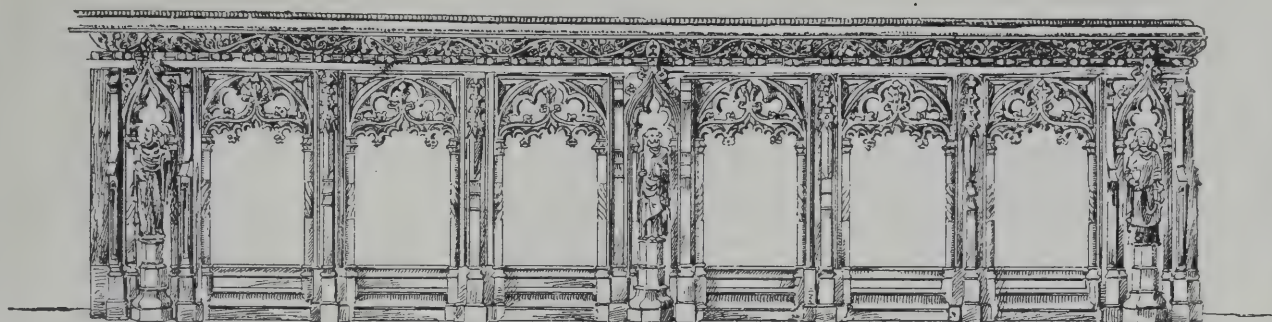
1885 Coffee House · Winson Green · Birmingham · W<sup>m</sup> DOUBLEDAY · ARCH<sup>t</sup> · BIRMINGHAM ·



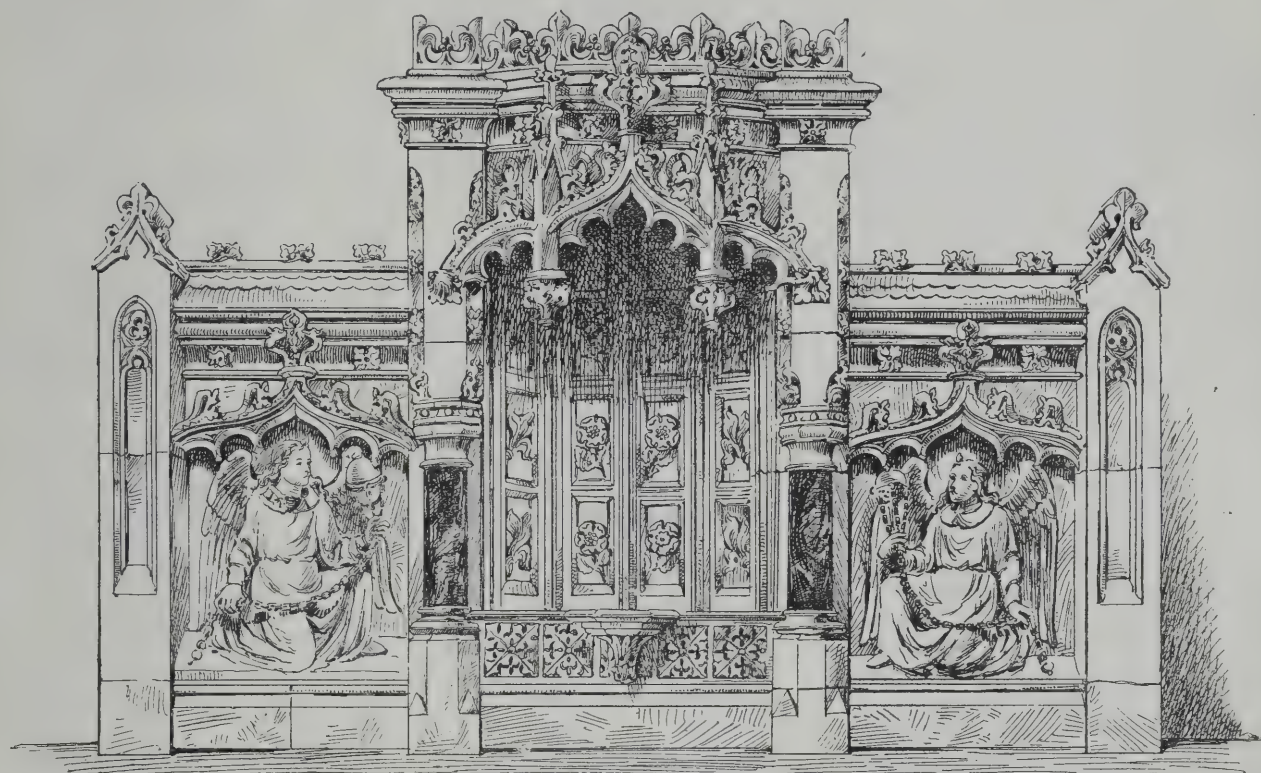




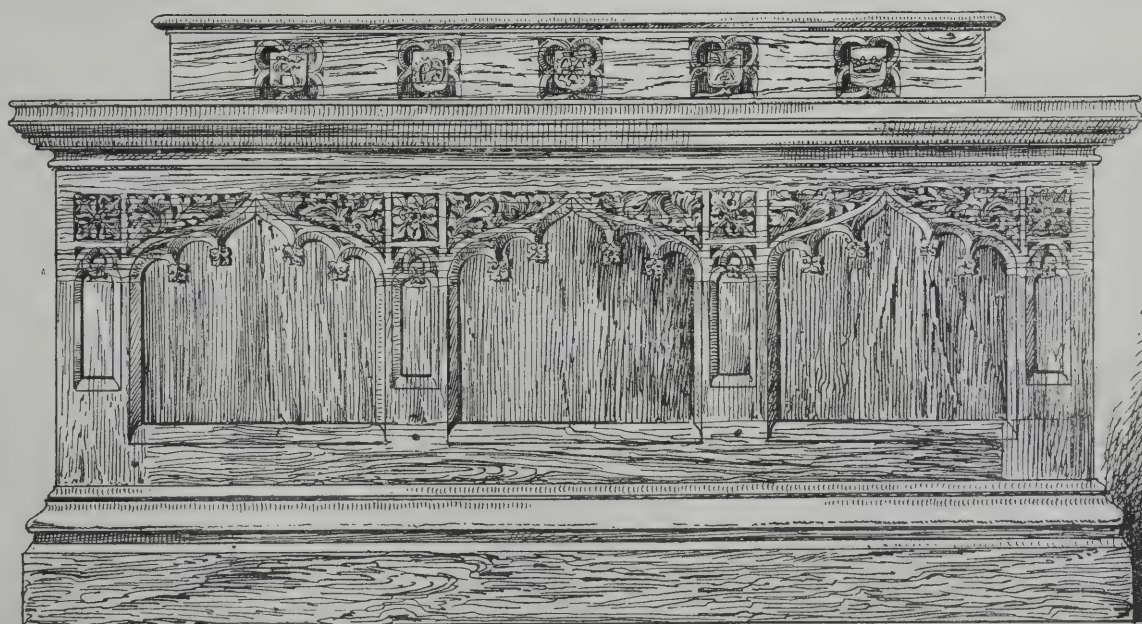




ALTAR RAILS · ST PETER'S · REVELSTOKE · G·W·CROSBIE · ARCHT



REREDOS · ENGLISH CHURCH CHILLONG INDIA · R·M·FULFORD · ARCHT



ALTAR · ST KATHERINES · CHAPEL G<sup>T</sup>BERKHAMSTED · CHAS H·REW·ARCHT



ECCLESIASTICAL DECORATIVE  
FURNITURE.

THE Ecclesiastical Furniture in our sketch is from the workshops of Mr. Harry Hems. The Altar Railing at St. Peter, Revelstoke, is very rich in design, the arcade being divided by niches with statues, and surmounted by a running carved ornament. The Reredos, for Chillong, India, designed by Mr. R. M. Fulford, of Exeter, has a centre canopied niche with a bracket under for the Cross, and a panel each side with a censuring angel. The shafts supporting the canopy are of marble; the back of same is divided into small panels, in each of which is a conventional form of Tudor rose or fleur de lys. Mr. Rew is the architect of the Altar shown. Below the front, which is divided into three cusped panels, on the retable, are five little quatrefoils, with shields bearing the emblem of the saint. This is for St. Katherine's Chapel, Great Berkhamsted, Herts.

## AT THE SALE ROOMS.

OUR illustration this week is taken from objets d'art recently sold at Messrs. Phillips, Son, and Neale's rooms in New Bond-street. The Armchair shown was a good example of Chippendale work, with the open back surmounted with the three Prince of Wales' feathers. The little Marqueterie Table calls for no special remark. The Commode was an elaborate and beautifully-mounted one, the ormolu being especially fine. Lately there have been several of the little Jewel Cabinets sold at Messrs. Philip, Son, and Neale's, and they are rather interesting. The one illustrated to-day was of a hard wood, something resembling lignum-vitæ, and inlaid with ivory and ebony. It had a number of small drawers inside, and stood on twisted and turned legs. The King-wood Casket was, we should think, used for storage of some valuables, and the brass-strap work was noticeable. There is on view at the collection of Armada relics, Drury-lane, a casket somewhat similar. At this sale there was a number of good antique objects.

## THE LATE COLONEL DUNCAN, M.P.

EVERYONE who watched the progress of the Architects' Registration Bill in Parliament, whether approving of or opposed to the measure, will regret the death of Colonel Francis Duncan, C.B., who so genially piloted the Bill through the House till its withdrawal. Colonel Duncan, who was in his fifty-second year, was a highly cultured gentleman, having matriculated at the University of his native city, Aberdeen, and obtained by examination the degrees of M.A. and D.C.L. at King's College University, Canada. Choosing the military profession, he passed first out of many hundreds of competitors into the Royal Artillery, and afterwards held many staff appointments. He was the author of several professional and other works, was the prime mover in the St. John's Ambulance Association, and in the successful scheme for establishing coffee taverns in garrison towns, and worked hard in other philanthropic causes. Having unsuccessfully contested Parliamentary seats in 1874 and 1880, he won the Holborn Division of Finsbury in 1885 and 1886, when his frankness, geniality, and straightforward manner gained for him the esteem of members of both political parties, qualities which were again conspicuously displayed, together with much tactical skill and perseverance in securing and making use of opportunities, in the House in introducing the Registration Bill in the spring of this year. Colonel Duncan had promised the Registration Committee to go on with the Bill, and had expressed his determination to get it through in some shape or other. At his suggestion the committee were at the time of his death (and still are) hard at work upon certain proposed amendments, not framed so much for the purpose of perfecting the measure as with a view of allaying opposition in certain quarters. At Colonel Duncan's funeral, at Charlton Cemetery on Tuesday, the Registration Committee were represented by Mr. H. Roumieu Gough, their chairman, and they also sent a wreath. Steps have already been taken to secure the aid of a well-known member of Parliament in carrying on the work of legal registration.

PRACTICAL ARCHITECTURE WITH  
DETAILED ESTIMATES.—XX.

By HENRY LOVEGROVE, F.S.I., Surveyor.

## BRICKLAYER.

Rods ft. in.		£ s. d.
41 22 0	Supl. Reduced brickwork in mortar as described, including rough cutting .....	
0 34 0	Supl. Do. extra only in cement .....	
0 197 0	" Half-brick wall in cement .....	
0 33 0	" Do. trimmer do. ....	
0 55 0	" Extra to rough relieving arch in cement over lintel .....	
0 65 0	" Extra to neatly axed arch in stocks and pointing .....	
0 61 0	" Extra to do. circular and do. ....	
0 6048 0	" Extra to red brick facings as described, and pointing .....	
0 15 0	" Extra to flat cut and rubbed, gauged arches in do., set in putty and pointing .....	
0 169 0	Supl. Extra to segmental do. and do. ....	
Yds. ft. in.		
0 819 0	" Damp course of two courses of slates laid to break joint in cement .....	
98 0 0	" Tile paving of 6in. red Staffordshire tiles, bedded and jointed in cement on and including cement ground .....	
0 14 0	Run. Circular cutting and waste on do. ....	
0 153 0	" Fair cutting in facings .....	
0 155 0	" Do. circular over arches .....	
0 3 0	" Edge of 6in. landing cut and planed in cement .....	
0 152 0	" Extra to red brick moulding one course high .....	
0 99 0	" Do. do. circular over arches .....	
	No. 20. External mitres .....	
	No. 4. Internal do. ....	
	No. 2. Stopped ends .....	
	No. 2. Splayed ends .....	
	No. 48. Do. stopped ends .....	
	No. 52. Mitred and returned moulded ends .....	
0 172 0	Run. Rake, wedge, and point flashings in cement .....	
0 51 0	" Do. do. stepped .....	
	No. 2. Ends rolled iron joints built-in in cement .....	
	No. 5. Extra to rough relieving arches over chimney bars in cement .....	
	No. 2. Extra labour forming plaster 4½in. wide, 2½in. projection, and 9½in. high, in red brick facings, including all cutting .....	
	No. 2. Extra to cut and rubbed swelled frieze 6ft. by 2ft. in do. and do. ....	
	No. 2. Extra to red brick carved and moulded corbels 12in. by 9in. by 9in. at ends of pilasters .....	
	No. 48. Frames bedded and pointed in lime and hair mortar, the reveals screeded .....	
	No. 11. Flues parged and cored with cow-dung mortar .....	

GLAZED BRICKS OF APPROVED QUALITY AND  
MANUFACTURE.

0 531 0	Supl. Extra to Cliff and Son's glazed brick facings, set and pointed in cement to form dado of approved tints, the lower part to a height of 9in., forming skirting of different tint to the upper part .....	
0 7 0	Supl. Extra to relieving arch in do. ....	
0 25 0	" Do. to flat discharging arch .....	
0 121 0	Run. Fair cutting in facings .....	
0 9 0	" Do. circular do. ....	
0 111 0	" Raking, cutting, and waste .....	
0 199 0	" Extra to rounded external angles, No. 2. Mitres .....	
0 274 0	Extra to circular internal angle, 14in. girt .....	
0 350 0	Extra to moulded capping to dado, 3in. high and 3in. projection, set and pointed in cement .....	
	No. 82. Mitres .....	
	No. 62. Stopped ends .....	
	No. 16. Mitred and returned stopped ends .....	
	No. 30. Pairs of do. 14in. girt to circular angles .....	
	No. 40. Ends steps made good to .....	

## TERRACOTTA.

0 1061 0	Cube. Best quality red terracotta from Mr. J. C. Edwards, Ruabon, to be properly worked to detail drawings and set with a fine joint in cement .....	
0 79 0	Run. Labour groove and burning in lead flashings .....	
	No. 24. Projecting moulded key blocks 9in. by 2ft. lin. on face .....	
	No. 3. Chimney-pots for three flues 5ft. by 2ft. 3in. by 2ft. 6in. ....	
	No. 1. Do., with pediment on one side .....	

## PATENT CONCRETE.

0 12 0	Supl. 6in. landing .....	
0 75 0	Run. 12in. by 6in. square steps .....	
	No. 4. Winders 3ft. 4in. by 3ft. 4in. by 6in. ....	
	No. 40. Ends steps built in in cement .....	
	No. 2. Ends winders do. do. ....	

Carried to summary ...

Rods ft. in.		MASON.—YORKSHIRE STONE.	£ s. d.
0 24 0	Supl. 2in. self-faced cover stone coped to widths .....		
0 12 0	Run. 9in. by 3in. rubbed threshold, back-jointed both edges .....		
0 22 0	" 14in. by 3in. do. do. ....		
0 88 0	" 9in. by 7in. rubbed top and face step, back-jointed on concrete bed, including joints .....		
	No. 2. Perforations through do. for rain-pipe .....		
0 92 0	Run. 15in. by 8in. do. do. do. ....		
	No. 4. Fair ends .....		
	No. 4. 3in. tooled templates 12in. by 12in. set in cement .....		
	No. 8. 3in. do. 14in. by 12in. do. ....		
	Chimney-pieces, &c., including fixing with necessary cramps and plaster, &c. ....		
	No. 6. Shelves 12in. by 3in., cut and pinned into wall with moulded front edge, and returns to form chimney-piece, including in glazed brick facings, and make good .....		
	No. 12. Brackets under ends of shelves 4in. by 9in. by 6in. moulded and carved on front cut and pinned into wall, including all cutting to glazed brick facing and make good .....		
0 98 0	Supl. Glazed tiles p.e. 10s. per yard bedded and jointed in cement, including ground and all cutting ...		
	No. 11. Glazed stoneware fenders to hearths to 2ft. 6in. opening for fire-place and fixing .....		

Carried to summary ...

Sqres. ft. in.		TILER.
67 25 0	Supl. Best Brosley strawberry-coloured tiles, laid to a 3in. gauge, and securely fixed with composition nails .....	
0 1613 0	Run. Cutting and waste on tiling against walls .....	
0 285 0	" Double course of tiles in cement, and pointing to eaves .....	
0 131 0	" Portland cement fillet and pointing to verges .....	
0 377 0	" Red ridge and hip tiles of approved pattern, 1s. 6d. p.c. per foot, and fixing and pointing with cement .....	
	No. 8. Intersections of ridge with two hips .....	
0 173 0	Run. Red purpose-made valley-tiles, and pointing with cement .....	
	No. 6. Wrought-iron ornamental hip hooks .....	
1 0 0	Supl. Tiling as before described, but vertical .....	
0 68 0	Run. Cutting and waste on do. ....	
0 20 0	" Double course at eaves and pointing with cement .....	
0 45 0	Supl. Ornamental vertical tiling .....	
0 37 0	Run. Raking, cutting, and waste on do. ....	
0 20 0	" Double course at eaves and pointing with cement .....	
	Leave all roofs clean and perfectly watertight on completion of works .....	

Carried to summary ...

## CARPENTER.

0 33 0	Supl. Centring to trimmers .....	
0 31 0	" Do. to segmental apertures .....	
0 26 0	" Do. to circular do. ....	
0 129 0	Run. Turning piece 4½in. soft .....	
0 77 0	No. 24. Notching for keystones .....	
0 1075 0	Cube. Fir in plates and lintels .....	
	" Do. framed in roofs, floors, and partitions .....	
0 20 0	" Do. do. in roof trusses .....	
0 169 0	Supl. Planing on fir .....	
1 45 0	" 2in. by 4in. sawn battening for vertical tiling .....	
67 25 0	" 3in. sawn close-jointed boarding to roofs .....	
1 50 0	" 1in. do. do. for lead .....	
0 86 0	" Do. do. and framings for do. ....	
0 66 0	" Gutter board and bearers .....	
0 156 0	" 2in. do. and framed ridge, &c. ....	
25 70 0	" Approved wood-block flooring and laying and grouting with cement .....	
0 42 0	Run. Circular cutting and waste on do. ....	
67 25 0	Supl. Inodorous roofing felt and laying, and allow for laps and waste, &c. ....	
0 57 0	Run. Labour splayed edge on lin. ...	
0 192 0	" Raking, cutting, and waste on lin. ....	
0 431 0	" Feather-edged tilter .....	
0 20 0	" Do. springer .....	
0 20 0	" Chimney gutter and bearers .....	
0 27 0	" 6in. by 2in. fir pitching piece spiked to wall .....	
0 81 0	" Stout herringbone strutting to 9in. joists .....	
	No. 118. Wrought and cut ends to 4½in. by 2½in. rafters .....	
	No. 12. Do. to 7 by 2 hips .....	
	No. 6. Extra to trimming ceiling joists 5in. by 2in. for ventilating panel 3ft. by 3ft. ....	
	No. 13. Fir-framed bridgings to 9in. joists .....	
	No. 32½. Dozen joint slips .....	
	No. 2. 2in. deal moulded roll .....	
	No. 4. Rebated drips .....	
	No. 8. Fir-framed wrought cleats for purlins out of 6in. by 4in. and 9in. long .....	

Carried to summary ...



JOINER AND IRONMONGER.			
For general descriptions of materials £ s. d. see Carpenter's Bill. All mouldings to be to detail			
ft. in.			
18 0	Cube.	Fir wrought and framed .....	
72 0	"	Fir wrought, framed, rebated, and beaded .....	
21 0	"	Do. twice rebated and twice beaded, transom and mullion, do. ....	
66 0	Run	4in. by 3in. fir wrought, framed, rebated, and moulded frame ...	
30 0	"	7in. by 4in. fir wrought, framed, twice rebated, and moulded transom .....	
50 0	"	9in. by 4in. do. do. ....	
	No. 20.	Ends of do. sunk with stops	
	No. 12.	Ends of 7in. by 4in. sunk with moulding returned, and mitred, and stop on front .....	
35 0	No. 20.	Do. 9in. by 4in. do. ....	
Run.	4in. by 3in.	fir wrought, framed, rebated, and beaded frame, circular, including joints, keys, and wedges, grooved for plaster ...	
60 0	Supl.	1 1/2in. pitch-pine flooring in 3in. widths, with splayed heading, joints, and mitred borders to hearths .....	
14 0	"	Do. and bearers in doorways,....	
DEAL.			
68 0	"	2in. moulded sashes in small squares with wide bars fixed ...	
488 0	"	Do. hung on butts .....	
20 0	Supl.	Moulded circular casement with wide moulded bars (measured square) hung on centres with and including cut and mitred beads	
68 0	Supl.	1 1/2in. four-panel bead butt and square doors .....	
33 0	"	Do. three-panel moulded and square doors .....	
140 0	"	2in. three-panel moulded both sides doors .....	
158 0	"	Do. moulded and flush half- glass doors, the lower part in four panels, the upper part filled in with wide sash-bars forming small squares .....	
99 0	Supl.	1 1/2in. wrought and rounded window-board tongued to oak, and bearers .....	
23 0	Supl.	1 1/2in. wrought and framed jamb linings and backings .....	
24 4	"	Do. wrought, framed, and double rebated do. ....	
35 0	"	1in. wrought one side and tongued, boarded as ceiling .....	
0 0	"	1in. do. tongued and beaded boarding .....	
23 0	"	1in. wrought fascia .....	
6 0	"	1in. wrought and framed riser...	
71 0	Run.	Labour rebate .....	
75 0	"	Labour do. 4in. girt .....	
	No. 64.	Stops .....	
196 0	"	Labour splayed edge on lin. ....	
576 0	"	Groove .....	
	No. 18.	Stops .....	
12 0	"	Labour scribing 1in. to concrete	
28 0	"	Raking, cutting, and waste on 1in. wrought, tongued, and beaded boarding .....	
150 0	Run.	Mitred beads fixed with brass cups and screws .....	
123 0	"	2in. by 1in. wrought door, stop planted on .....	
191 0	"	2 1/2in. by 3in. wrought, splayed, and rounded fillet as architrave, in- cluding mitres .....	
	No. 38.	Rounded ends to do. ....	
22 0	Run.	1in. wrought and rounded nosing tongued to floor .....	
	No. 4.	Mitres .....	
	No. 2.	Mitred and returned rounded ends .....	
72 0	Run.	3in. by 1in. wrought and cham- fered fillet .....	
164 0	Run.	Wrought, framed, splayed, and beaded grounds .....	
41 0	"	Wrought and rounded lining, grooved and tongued .....	
96 0	"	Wrought and framed jamb linings and backings .....	
72 0	"	4in. by 1in. wrought one side, filling in piece, splayed one edge	
11 0	"	Wrought and rounded window- board, tongued and grooved ...	
	No. 2.	Notched and mitred, returned rounded ends .....	
349 0	Run.	6 by 1 wrought one side, eaves fascia splayed one edge .....	
72 0	"	6 by 1 do. do. out and fitted be- tween rafters .....	
85 0	"	1 1/2in. by 1 1/2in. wrought balusters framed, one end to deal, the other to mahogany .....	
	No. 26.	Turnings to do. 2ft. long .....	
270 0	Run.	2in. by 2in. wrought, framed, and moulded frame, rebated for iron casements .....	
55 0	Run.	9in. by 2in. wrought and framed barge-boards .....	
	No. 2.	Cut ends to do. ....	
40 0	Run.	2in. by 1in. moulding, planted on face of barge-boards .....	
	No. 4.	Apex mitres .....	
	No. 8.	Mitred and returned moulded ends .....	
89 0	Run.	Small deal moulding on fascia...	
45 0	"	Moulding out of 3in. by 2in., planted on .....	
	No. 1.	Mitre .....	
	No. 28.	Mitred returned moulded ends	

Yds. ft. in.			£ s. d.
0	82	0	Run. Moulding out of 4in. by 3in., and fixing as part of cornice ... No. 4. Splayed ends ..... No. 60. Notched and returned rounded ends to 1½in. window boards ..... Honduras mahogany and French polishing .....
0	15	0	Run. 3in. by 2in. framed and moulded handrail .....
0	18	0	No. 4. Ends cut and wedged..... Run. 4in. by 4in. framed newels ..... No. 4. Turnings to do. long ..... No. 4. Turned caps to do. ....
OAK.			
0	105	0	Run. 4in. by 3in. wrought, framed, rebated, sunk, weathered, and grooved sill .....
0	15	0	Run. 6in. by 3in. wrought and framed wall-piece.....
0	198	0	" 6in. by 6in. do. posts .....
0	50	0	" 7in. by 4in. wrought, framed, sunk, weathered, rebated, beaded, grooved, and moulded on front edge sill .....
No. 20. Ends sunk with moulding, mitred, returned, and stopped .....			
No. 8. 3in. circular ribs to form arced, wrought, framed, and pinned with oak pins out of 2ft. 9in. by 2ft. 6in., including heading joints.....			
No. 16. Do. do. 3ft. 6in. by 2ft. 4in. ....			
No. 4. Do. do. 4ft. 2in. by 2ft. 4in. ....			
Ironmongery of the best description and approved manufacture, including screws and fixing:—			
No. 69. Pairs 3in. wrought-iron butts .....			
No. 11. Do. 3in. do. ....			
No. 4. Small barrel bolts .....			
No. 4. Japanned iron thumb latch .....			
No. 2. Mortice cupboard locks .....			
No. 7. 6in. mortise locks and brass furniture .....			
No. 8. Do. and white china do. ....			
No. 7. Sets plain brass finger-plates one long and one short .....			
No. 16. Do. white china do. do. ....			
No. 5. Norton's patent door-springs .....			
No. 4. Pairs brass sash-centres .....			
No. 5. Japanned iron lever casement fastenings.....			
No. 5. Do. do. stays .....			
No. 50. Brass lever casement fastenings .....			
No. 50. Do. do. stays .....			
No. 48. Elsey's patent opening apparatus for iron casement 13ft. from floor .....			
No. 4. Sets, lines, and pulleys, &c., to open and close casements, 21ft. 6in. from floor .....			
No. 6. Perforated zinc panels 3ft. by 3ft., and fixing in ceiling.....			
No. 18. Iron dowels and mortises in fir and stone .....			
No. 12. Do. do. and do. in terracotta .....			
No. 6. Ventilators with Boyle's patent air-pumps and fixing on roof, including all cutting to tiles and trimming rafters .....			
0	105	0	Run. Galvanised iron tongue, bedded in white-lead, and groove in oak and terracotta.....
No. 12. Pieces of hoop-iron about 1ft. 6in. long, nailed to oak post, and built into wall .....			
0	39	0	Run. 2in. diameter polished brass handrail, including brass brackets and fixing to glazed brick wall.....
No. 2. Extra to bends in do. ....			
No. 2. Flanged ends do. and fixing with screws to wood newels .....			
No. 2. Ornamental brass terminations .....			

FOUNDER AND SMITH.—CAST-IRON AND HOISTING AND FIXING.

0 237 0			
Run. Half-round eaves gutter, with proper red-lead joints, and screwed to fascia			
No. 20. Extra to stopped ends			
No. 4. " to angles			
No. 12. " to outlets			
0 135 0			
Run. 3in. diameter rain-water pipe, jointed with red-lead, and securely fixed to brickwork with pipe nails			
No. 8. Extra to plinth bends			
No. 2. " to shoes			
No. 2. " to junctions			
No. 10. " to swan-neck bends			
No. 2. " to purpose-made do., 4ft. long, including pattern			
No. 4. King heads, weighing 1b. each, and pattern			
No. 8. Shoes for principals, weighing 1b. each, and do.			
No. 6. Dr. Teale's grates to 2ft. 6in. openings and setting, &c., complete			
No. 5. Cast-iron chimney-pieces with register grates to 2ft. 6in. opening and fixing complete			

WROUGHT IRON AND HOISTING AND FIXING.

Cwt. qrs. lbs.			
9 3 7			
Run. Rolled iron joists cut to lengths and fixing 15ft. from ground			
1 0 7			
Run. Chimney bars built in brick-work, the ends split and turned up and down			
7 1 16			
Wt. tie and king-rods, with heads, nuts, and washers			

Cwt. qrs. lbs.		£ s. d.	
		No. 4. Extra to forging eye on 1 1/2 in. tie-rod for 1 1/2 in. king.....	
		No. 20. Wrought-iron, framed, and casements 1ft. 11 in. by 1ft. 11 in. in small squares hung on centres and fixing in wood frames as hopper ...	
		No. 12. Do. do. 1ft. 10 in. by 2ft. 6 in. and do. ....	
		No. 4. Do. do. 3ft. 3 in. by 2ft. 6 in. and do. ....	
		No. 12. Do. do. 3ft. 5 in. by 2ft. 6 in. and do. ....	
Yds.	ft. in.		
0	18 0	Run. 1/2 in. wrought-iron pipe for hot water, including elbows, bends, short pieces, tee-joints, and connections, &c., and filling complete and lapping with felt .....	
0	128 0	Run. Do. do. provisional.....	
		No. 6. 1/2 in. brass screw-down hot-water taps .....	
		Provide the sum of £5 for electric bells .....	
		Provide the sum of £10 for gas-pipes and fittings, and allow for fixing ...	
		Carried to summary ... £	

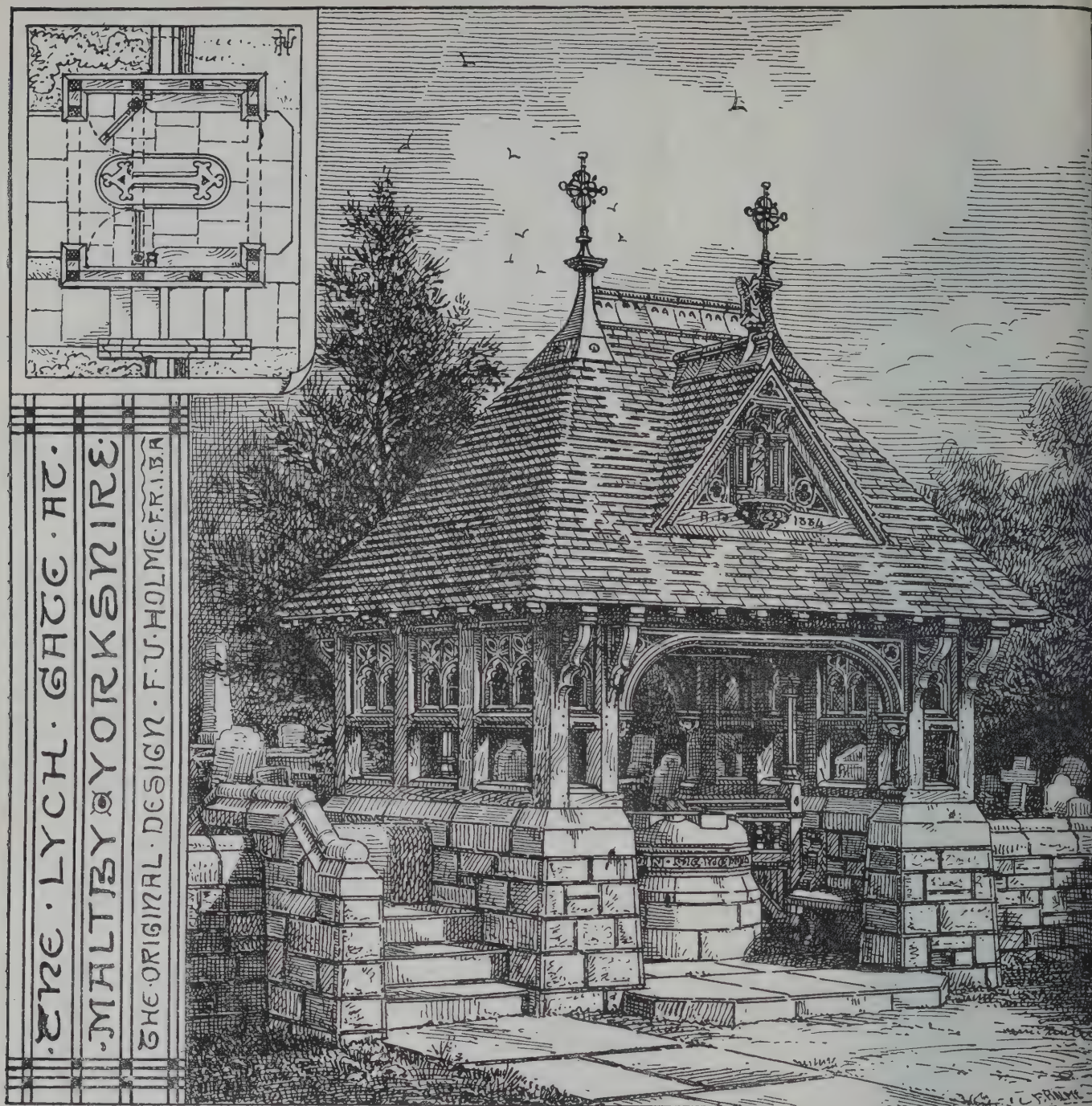
COMPETITIONS.

CARDIFF.—In response to advertisements, over fifty architects from all parts of the country competed for new offices, Bute Docks, Cardiff, for Messrs. Cory Bros. and Co. (Limited), and the two premiums offered have been respectively awarded to Mr. E. H. Bruton, of 15, Queen's-street, Cardiff, and Mr. E. A. Lansdowne, 26, High-street, Newport.

MILAN.—The official notification of the jury's award has been made known. It was drawn up on the 31st ult. The successful architect is Signor Brentano, of Milan, but Signor Beltrami is so far associated with the work that he is to have the carrying out of part of his design—i.e., a belfry tower adjoining the Duomo. It will be mainly composed of the old Renaissance features of the existing front. The following is the list of awards:—For the 5,000f. premium—Luca Beltrami, Milan; Ed. Deperthes, Paris; H. Nordio, Trieste. For the 3,000f. premium—Antonio Weber, Vienna; Rudolf Dick, Vienna; Gio. Locati, Milan. For the 2,000f. premium—G. Moretti, Milan; D. Brade, Kendal; Hartel and Nickelman, Leipzig; P. Cesa-Bianchi, Milan; Carlo Ferrario, Milan; L. Becker, Mayence; Tito Azzolini, Bologna. Last week we illustrated the only English premiated design. One competitor, Theodor Ciaghin, of St. Petersburg, has died since the first selection of competitors was made.

PUBLIC OFFICES, NEW SWINDON, WILTS.—At a meeting of the Local Board held on Tuesday, November 13th, the following gentlemen were the four selected candidates out of 27 competitors:—Mr. Brightwen Binyon, of Ipswich; Messrs. Henman





THE LYCH-GATE, MALTBY CHURCH,  
YORKSHIRE.

OUR illustration shows the original design for this gate, as furnished in 1884. An amended plan, with the gable omitted, was approved, and, through some misunderstanding, the work was carried out by a local builder without details being supplied by the architect. It was intended that the framing, gates, &c., should be of English oak, and the roof covered with tiles or oak shingles. A similar oak lych-gate was erected some years ago from the designs of the same architect, Mr. F. M. Holme, F.R.I.B.A., of Liverpool, at Ackworth, in the same neighbourhood.

#### THE TURKISH BATH: ITS DESIGN AND CONSTRUCTION.

By R. OWEN ALLSOP, Architect.

##### VIII.—WATER-FITTINGS AND APPLIANCES.

THE water-fittings of a Turkish bath include a boiler of some form for heating the water, a cold-water cistern, and a hot-water tank; supply-pipes, flow and return-pipes, and branch pipes; lavatorium fittings, comprising bowls, basins, and cocks; douche room fittings, as the "needle" bath, shower, douche, spray, and "wave" baths; a warm

shower-bath for bathers entering the bath, or desiring such a shower at intervals, and the fittings of the plunge bath. In addition to this there may be required a drinking-fountain in the tepidarium, and an ornamental fountain in the frigidarium; lavatories in various positions, and, possibly, fitting<sup>s</sup> and appliances for the laundry.

Premising an ample supply of pure water, it must be brought into the building through a water-meter to the cold-water cistern, which should be at a sufficiently high level to obtain a good "head." This cistern must be capacious and properly connected on the ordinary circulating principle, with a hot-water tank and boiler. Of suitable boilers there are several in the market, of many and varied designs. Simplicity of construction should be the guide to a selection. The boiler will perhaps be most conveniently placed in the stokery, and have its separate furnace and flue, any scheme for combining the heating of the hot rooms and of the water being out of the question. In small baths, however, the hot-water tank may, for economy's sake, be placed near the ceiling in the laconicum. Where waste steam can be obtained, a water super-heater, with steam coil, may be employed with advantage; but in the majority of cases the ordinary circulating system will be found the most suitable.

The supply-pipes must be of large section,

and, indeed, the whole scheme of water-fitting should be liberal. It must be remembered that, in addition to the wants of the lavatorium and douche-room, plunge, &c., there will be a large amount of water required for laundry purposes, if washing be done upon the premises.

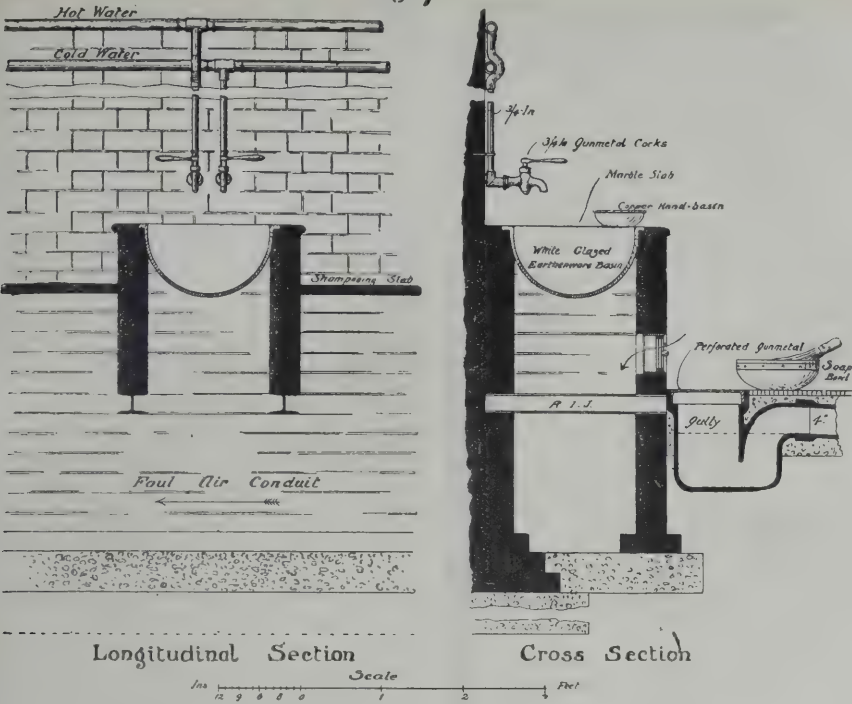
The cold supply cistern may, by the exigencies of the case, be kept down as low as the ceiling of the bath-rooms, and be placed over some subsidiary apartment. This does not give much pressure of water. For all purposes it is best to have the cistern at least two stories, or a minimum of about 20ft., above the draw-off taps and valves of the various bathing appliances. This will insure a good head of water, and make the douche a formidable affair.

The pipes, unions, tees, valves, and cocks should all be of the best description in so important a work as the fitting-up of a public bath. Ordinary, bungling plumbing is here out of place. Lead piping should be discarded for all but very cheap work, and iron employed in its stead, with proper screwed joints, angles, and tees. Should there be sufficient means, copper piping should be employed for anything under 1in. internal diameter, and gunmetal should be used for unions, &c., and cocks and valves.

Handsome, large, and well-made water-fittings conduce, in no small degree, to the



Fig. 7.



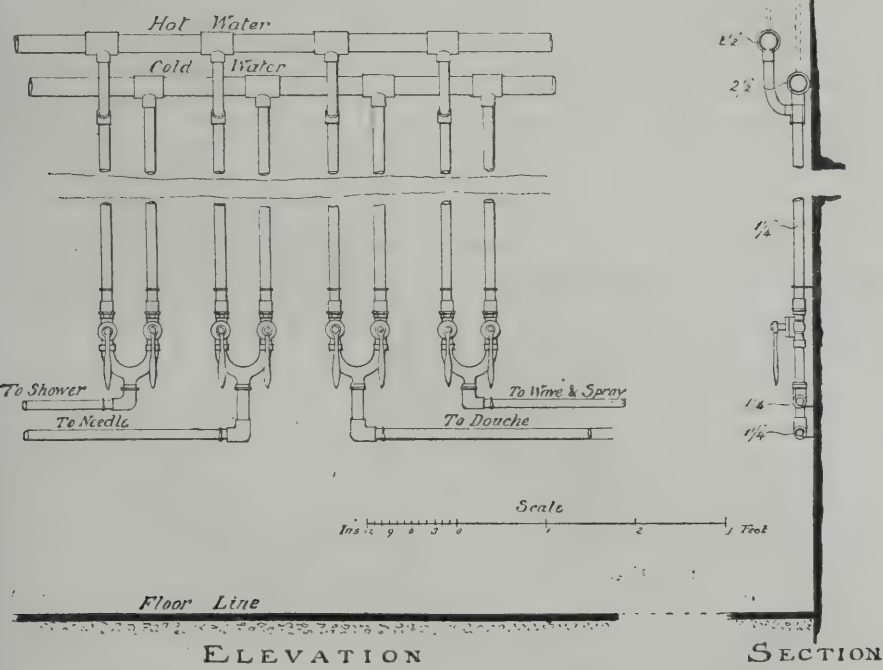
effect of a bath. There should be no attempt at hiding away of pipes, &c. They should be made features of the bath, and be designed with care and neatly finished. Every pipe, joint, and connection should be prearranged, and the means of fixing and supporting the same carefully designed. Boxings, and the like, should be discarded, and everything frankly exhibited. The day for mysterious plumbing has gone by. There is some beauty even in a pipe.

To consider the fittings, we will commence

affixed to the wall, or be hung by iron ties, as indicated by dotted lines at Fig. 10. The internal diameter—the measurement given in all the Figs.—of these branch pipes to cocks over shampooing basins should be  $\frac{1}{2}$  in.

Cocks and valves for the purposes of the Turkish bath are best of the "gland" pattern. They should have bold handles. Those of the screw-down type are useless, except as stop-cocks. Roundways should be used, and, to insure freedom of running, the turning part should be equal to the inner diameter of cock.

Fig. 10.



with the lavatorium. Branches from the hot and cold water supply pipes must be conducted to each shampooer's basin. These may be finished separately, with independent nozzles, as at Fig. 7; or the pipes may be connected with the valve shown at Fig. 9, about 18 in. above the basin, the outlet of the valve being fitted with a foot or 15 in. of indiarubber hose. In the latter case the pipes and valve would stand some 9 in. from the wall, and depend from the horizontal supply pipes, which in their turn could be carried on wrought-iron brackets

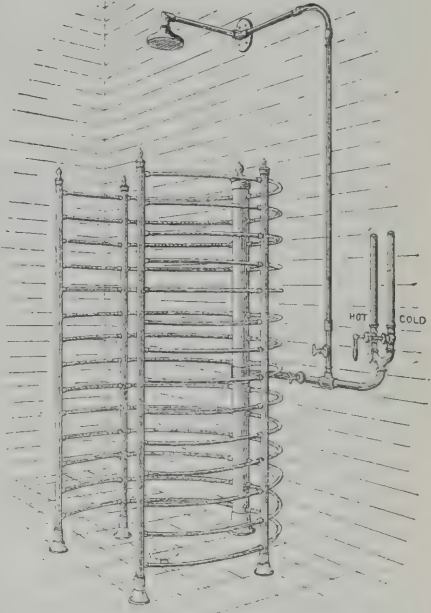
The whole should be of gunmetal, and, if the pipes to be used be of iron, screwed at the end. Fig. 9 shows the type of valve to be employed to regulate the temperature of water for shower baths, &c. It is that manufactured by Messrs. Hayward Tyler and Co., and is bold and effective in appearance. The handles should be large.

In every case, the cold water must be placed on the right hand, and the hot on the left.

The earthenware basin is provided to hold water mixed to the required temperature. A

waste and overflow are not necessary, but are sometimes provided. The basin is best wide and shallow—shallower than shown. There should be no overhanging ledge to catch the shampooer's hand-basin; for this reason I have shown, at Fig. 7, the basin sunk into the

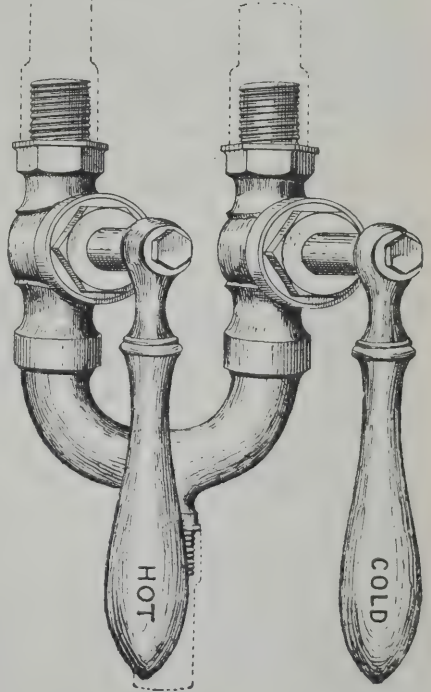
Fig. 8.



marble slab, instead of the marble being on top, as ordinary. The copper hand-basin is provided for the shampooer to take water from the earthenware basin and throw over the shampooing slab, or over the bather. In addition, a wooden, copper-banded soap-bowl must be provided.

Should there be a row of shampooing basins and benches, the horizontal supply-pipes must

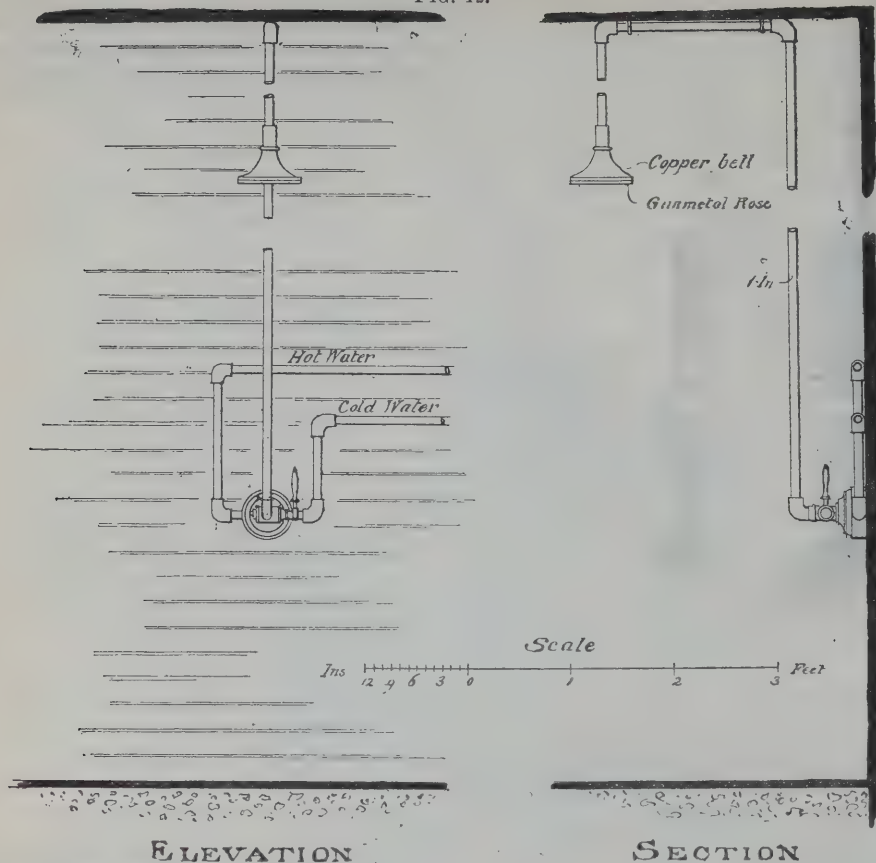
Fig. 9.



be continued along the wall, and branches dropped to each basin. The basins are most conveniently placed when raised somewhat higher than the benches. In the illustration given, I have shown how to arrange for horizontal foul-air flues under the basins. In other cases the fixing of the basin will be much



FIG. 12.



ELEVATION

SECTION

simpler. For pure lavatorium purposes these basins, cocks, &c., are all the water-fittings to be considered; but in an apartment combining the purposes of douche-room—and perhaps a plunge-bath chamber—as well as a washing and massage-room, more or less of the fittings about to be described will have to be accommodated.

The tonic appliances for treating the bather subsequent to the shampooing, the soaping, and the cleansing are various. The most useful is the simple shower bath, with a very large rose, and amply supplied with water through a regulating valve. It is employed for thoroughly cleansing the bather before he enters the plunge, whose waters are for the common use of all. In many small baths its place is efficiently taken by an ordinary hand rose or spray of the kind shown at Fig. 11. The shower

in a convenient position for the attendant to work must be placed the regulating valve.

A more elaborate contrivance may be made, which will include needle, shower, ascending shower, spinal douche, and back shower; but this should be left for hydropathic institutions and invalids. Simplicity in these matters should be the great desideratum. The above-named additions, however, may be briefly described. At Fig. 7 I have indicated the position of ascending shower. It would be connected with the pipe supplying needle and shower, and have a stop-cock. The spinal douche is a little nozzle behind the shower proper, and should have similar connection with the supply-pipe. The back shower or spinalspray would be a rose placed about half-way up the iron backbone, and be connected in the same manner. Avoid these complications in a bath for healthy persons.

The needle-bath is generally left exposed, but it may be inclosed in a metal shield if desired. This bath may be placed in one of three positions—(1) in the shampooing-room, (2) in a separate chamber, (3) in the plunge-bath chamber. It is most conveniently placed when the bather passes it *en route* from the washing-room to the plunge. For this appliance a good head of water is absolutely essential, as with low pressure it is very ineffective. The illustration shows the bath standing on iron shoes. If fixed in a corner, as ordinarily, it can be secured to the wall by such cramps or brackets as may be necessary.

Besides the needle and shower, as above, the tonic bathing appliances may include an ordinary horizontal "douche" that can be pointed in any direction, a "spray" or large rose, and a "wave." These three appliances may be placed together as at Fig. 11. They are connected to the pipes from the regulating valves by means of a foot or so of flexible hose. To this is secured a tapering copper pipe. The douche has a gunmetal nozzle. It is directed against the back and spine, but must not be used upon the head or chest. With a good head of water this is a most powerful appliance, feeling more like a rod of some solid substance pressing against one rather than a stream of water. The "wave" is formed by a copper spreader. The spray is simply a large rose, 6in. or 8in. diameter.

It may be found convenient to arrange the valves for the whole of the above-mentioned appliances together, as shown at Fig. 10. Each

pair of hot and cold handles are here brought together. These handles should be long, so as to admit of easy regulating of the temperature of the water; they may well be 9in. in length. The douche, wave, and spray should be kept as close as possible to the handles that regulate their temperature. It is perhaps scarcely necessary to have a regulating valve to these appliances, as they are generally taken cold.

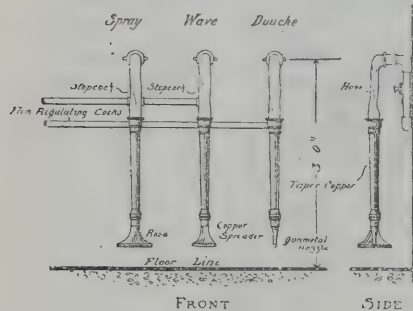
I would repeat the caution that it is very necessary to beware of complications in these water-fittings and appliances. Some of the more "fussy" contrivances—as, for example, the elaborated needle bath as above described—require so much regulating, and so many valves and stop-cocks, that is quite an undertaking for the attendant to set them going. Simplicity in design and construction should be aimed at in this work: the pipes as few as need be; the valves and cocks as simple as possible; and the whole put together in a manner that will permit of their being easily got at and repaired.

I have before hinted at the desirability of making some sort of provision whereby the bather may, on entering the bath, have a warm spray or shower, of any temperature that may be just agreeable to him. In high-class baths this feature should always be provided, as it is a great luxury, and, moreover, to certain constitutions a necessity thus to be able to take such a shower before entering the hot rooms, or at such intervals during the sojourn in these apartments as may be desired. The proper position for this shower-bath requires some consideration. Were it only for the entering bather that it should be provided, it would be best placed in a lobby near the entrance to the hot rooms; but as the person in the hot rooms may frequently desire some such shower, it must be arranged with regard to this fact. It should be convenient for the entering bathers and for those in the bath. A small chamber entered by doors from the lobby to tepidarium, and also from the tepidarium itself, would be convenient. At times it may be placed in a nook off the shampooing room. Wherever it be placed, the apparatus provided for the purpose of the shower must be such as can be managed by the bather himself, so as not to take up the time of the attendants; and for this reason it must be capable of easy regulation, and free from liability of scalding the user, unless through gross carelessness. A valve with one handle only must be employed, as it is difficult to obtain this immunity from danger of scalding when two handles are used, unless the bather has had some practice. A valve such as that shown at Fig. 12 should be employed. It is one made by Mr. H. Mather, of Brownlow-street, Holborn. This valve must be so designed as to supply cold, tepid, and hot water in regular gradation—not intermittently, as do some valves of this description. It must be so placed that anyone taking the shower may, whilst beneath the rose, be able to easily reach the handle. The rose should not be less than 6in. or 7in. diameter. Fig. 12 illustrates the complete fitting up of this bathers' shower-bath.

In hydropathic establishments it might be an improvement to add a small foot-bath, formed by a sinking of about 6in. in the floor, and filled with hot water, as physiologists tell us it is bad for invalids to enter the hot rooms with cold feet. Cocks, a waste, and overflow would have to be provided for this bath, and a marble seat might be placed round it. A marble coping and mosaic-pattern flooring would render it pleasing in appearance.

On page 103, *ante*, I have given plan and sections of a plunge bath, and shown its water-fittings. The overflow and waste run into cast-iron drainpipes, which should be employed till outside the building. On the end of the overflow pipe is screwed a gunmetal rose with leather packing, the screw-holes being drilled into the flange of pipe. For the waste I have shown one of Messrs. W. H. Bailey and Co.'s (Salford) "disc" valves, of gunmetal. This is similarly screwed to flange of pipe, and with leather packing. The valve is opened and closed by a movable rod. If fixed, it might catch the toes of the swimmer, and for this reason it would perhaps be best to set the valve itself back in a recess. Instead of this valve, an ordinary 4in., 5in., or 6in. "plug" waste could be employed, but it is rather clumsy on such a scale. The supply-pipe should be connected

Fig. 11.



FRONT

SIDE

proper is usually fixed above the "needle" bath, as at Fig. 8, or formed by a continuation of the "backbone" of the needle. It is best to have separated regulating valves for the needle and shower, as at Fig. 10; but at Fig. 8 it is shown with a branch from the pipe conducting to the needle, and with stop-cocks. The needle-bath is a skeleton-like structure, having a large hollow backbone and branching ribs. The water ascends the backbone, and, passing into the ribs, squirts out of small holes punctured in their internal circumferences. The bather stands in centre of the apparatus, with the ribs encircling him. The ribs should be of 3in. copper piping, the backbone and lesser supports being of iron, 2½ and 1½in. diameter respectively.



with the main supply just after the water meter. The valve should be of the "screw-down" pattern, either with a thumbscrew, wheel and spindle, or a key.

In coast towns, where a *sea-water* plunge may be employed, a little rose on a bracket should be provided in a convenient position for the cleansing of the hair from the salt water.

Of the lavatory fittings in the cooling room, and of the "sanitary" water fittings, it is unnecessary to speak, except to say that, in a place devoted to the attainment of cleanliness, the plumbing should be as perfect as possible.

A drinking fountain is a desirable feature in the tepidarium of a bath of any pretensions. It should be placed at the coolest end of the apartment, affixed against a wall, and provided with a supply-pipe, waste, and tap of some sort. The bowl is best formed of glazed earthenware.

If an ornamental fountain be required in the frigidarium, it should be of terracotta or modelled glazed ware, and must be provided with supply-pipe, waste, and means of regulating the jet of water. A fountain is a very desirable addition to a cooling room, as it is restful to the ear, and may be made pleasant to the eye by means of flowers and plants arranged around and upon it.

(To be continued.)

## Building Intelligence.

**CAVERSHAM.**—St. John the Baptist's Church, Lower Caversham, near Reading, was consecrated last week. The church is Early Fifteenth Century in style. Its walls are of rubble, faced externally with snapped flints, in the local fashion, and internally by brickwork covered by plaster. The stone used for quoins, dressings, tracery, piers, and arches is Bath stone, from the Box Ground quarries. Chequer work in flint and stone is used as an ornament to the outer walls of the chancel. The building is of necessity plain, almost the only carved work being at the west door. The church has an unusual feature in the upper floor of the transept, on the south side, which provides an extra room available for meetings, Sunday school classes, &c. The panelled ceiling of the chancel has been painted from the architect's designs. The church and its fittings, as well as the altar cloths and hangings, have been designed by Mr. E. Prioleau Warren, of Staple Inn, London; the builders were Messrs. Wheeler Brothers, of Reading. The church will seat 400 persons.

**EDINBURGH.**—To make way for modern improvements, another landmark has been removed from the High-street of Edinburgh, in the shape of a time-worn composition of timber and plaster work which, with its towering six stories high-pitched gable, its projecting bresummers at each floor, and the quaint arrangement of its fenestration, formed a conspicuous feature on the north side of the street, about midway between the North Bridge and John Knox's House. A few steps encroaching upon the street pavement gave access to a dark, narrow stone staircase of the 16th century. This staircase is retained, but is now lighted and ventilated. The old timber and plaster building has been removed, and in its stead has been erected a new stone tenement, six stories high, containing a shop, with cellar below and houses above. The original building, condemned last year by the sanitary authorities, was divided internally by timber partitions, each flat containing four rooms occupied by separate families, with no water or sanitary conveniences. The floors had sunk over a foot deep below the original levels, and but for the tenacity of the bent, rough-hewn beams of home-grown red timber, the structure must have collapsed long ago. In the reconstruction each flat is formed into a single house of two rooms, kitchen, and lobby, all lighted and ventilated, and supplied with sink, water, gas, and other conveniences. Mr. Edward Calvert, 10, North Saint Andrew-street, Edinburgh, is the architect.

**LANGLEY, BUCKS.**—The committee of the Langley New Town Mission Church having instructed their architect, Mr. Albert E. Pridmore, of 2, Broad-street Buildings, to prepare the necessary plans, &c., that gentleman has for-

warded two separate schemes, which will be discussed, and the course to be adopted decided at the next meeting.

**LAPFORD.**—The 15th century parish church of Lapford, North Devon, was reopened on Saturday after restoration, a work carried out from plans and specifications prepared by Messrs. Packham, Croote, and Stuart. The restorations include new buttresses to the north wall, of local stone, with Hatherleigh quoins and Bath stone weathers, a new heating apparatus chamber, and new windows on the south side. The nave roof has been taken off and made good, and all the massive oak timbers, previously hid by plastering, are now exposed to view. The plastering on the walls has also been removed, and the stonework painted. The whole of the work has been carried out by Mr. Harry Hems, church furnisher, of Exeter. Mr. James Baker was Mr. Hems' foreman on the spot.

**ROMSEY.**—The Abbey Church was re-opened on the 15th inst. after restoration, at a cost of £1,200. The works include the removal of the galleries from the transepts and the old pews from the aisle, and the removal of the organ from the north gallery and its reconstruction with considerable additions in the first bay of the chancel. Cathedral chairs have been substituted for the pews. The organ, besides the addition of several stops, has been fitted with a new case, made by Mr. Wheeler, of Romsey; whilst Messrs. J. W. Walker and Sons, who built the organ in 1858, have carried out its enlargements. The vicar has utilised a fine piece of old wood carving, and has had it mounted as a chancel rail; formerly it was used to shut off the north transept, but it has been for years stored away. There is much restoration work remaining to be done to the abbey, the principal part of which is the repair of the mutilated window in the north transept, and the heightening, repairing, and strengthening of the roof on the south side of the abbey, so as to enable the triforium in the chancel and nave to be opened out.

### CHIPS.

The opening services of the new Welsh Calvinistic Methodist Chapel in the Charing Cross-road, which has cost £15,000, were begun on Sunday. The chapel, which has been built by Messrs. Peto Brothers, from designs by Mr. James Cubitt, was illustrated in the BUILDING NEWS for Jan. 13 of the present year. The chapel is cruciform on plan, and is chiefly lighted from a central octagonal lantern. The walls are externally of Yorkshire parpents, with the architectural details in Ancaster stone. The inside of the chapel is lined with Fareham red bricks, the circular pendentives of the dome and the pointed barrel vaults over the short nave and transepts being of the same material.

The removal of an accumulation of soil during the building operations at a private house in Eastgate, Lincoln, has brought to light an important fragment of the eastern wall of the Roman city, consisting of a large quadrangular block of solid masonry, with dressed facing, projecting inwards from the wall. It is probably the basement of a quadrangular tower strengthening the wall, midway between the north-east angle and the east gateway.

Plans by Messrs. Stevenson, civil engineers, of Edinburgh, have been adopted for the proposed harbour to be constructed at Balintore, near Tain, N.B., a provisional order for which will be sought next session.

The Crosby Home Mission Hall and keeper's house in Commercial-road and Flinders-street, Liverpool, were opened on Saturday. The buildings are of brick with terracotta dressings, and accommodation is provided in the large hall for 250 persons. Messrs. Mercer and Allender were the architects, and Mr. S. Webster, of Bootle, was the contractor.

The proposed purchase of the Braid Hills by the corporation of Edinburgh came before the town council on Tuesday, and a division was taken, with the result that the former resolution of the council to enter into a provisional agreement for the purchase of the 134 acres which the Cluny trustees were willing to sell for £11,000 was affirmed by 23 votes to 15.

A meeting of the members of the National Conservative Club was held on Monday, the Duke of Abercorn presiding. It was resolved to enlarge the club house by 110ft. in Pall Mall, it being shown that half the amount required had already been subscribed by about 200 members.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

### TERMS OF SUBSCRIPTION.

One Pound per annum (post free) to any part of the United Kingdom; for Canada, Nova Scotia, and the United States, £1 8s. 8d. (or 7dols. 30c. gold). To France or Belgium, £1 8s. 8d. (or 36fr. 80c.) To India (via Brindisi), £1 17s. 4d. To any of the Australian Colonies or New Zealand, to the Cape, the West Indies, or Natal, £1 10s. 10d.

### ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of eight words, the first line counting as two, the minimum charge being 5s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

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### SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII, XLVI, XLIX, L, LI, LII, LIII, and LIV may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—R. A. and Co.—W. S.—J. C. E.—F. B.—H. and G.—C. of D.—H. B. and E.—S. L. B.

SECRETARY, S.S.A. (If provincial secretaries wish reports of their societies to appear they must be brief, and sent in time. Your meeting was on Tuesday week, and the report only reached us last Friday morning—after last week's issue was published. We have no room for what would be stale news this week.)

## Correspondence.

### CLAUSES IN BUILDING CONTRACTS.

To the Editor of the BUILDING NEWS.

SIR,—The letter from Mr. Crocker (professedly on behalf of the architects of Exeter) in your last issue is evidently written in opposition to the plea for justice to builders in Mr. Waterhouse's excellent address as P.R.I.B.A.

In the form of contract published by the National Builders' Association, the quantities (Mr. Crocker says) are made a part of the contract, and all errors are to be rectified at any period during the progress of the contract and up to the time of its final settlement, upon a request in writing by the builder. The words here given in italics may be omitted, we imagine, without taking away the intended common-sense meaning, and the proposal will not then appear so alarming to the nervous gentlemen of the ancient city of Exeter, who insult builders by looking upon them as possessed with the evil spirit of plunder, in pursuit of which they will make "pettish use" of any "unfair weapon," and imagine builders have so little to do in management of men and arrangement of materials, and are so fond of figures, that they will find pleasure in keeping the poor architect, who takes out his own quantities, "constantly overhauling of the items of each bill."

His statement that a builder, whilst intimating to the architect all deficiency, "would hardly note any excess," might be replied to, that the architect (who takes out his own



quantities) whilst intimating to the builder all deficiency in the work, would hardly note any excess.

It will perhaps astonish the gentlemen of Exeter to know, that when quantities are supplied by a properly trained surveyor, it is very rare to find errors; but we do find they charge less commission than the architect-surveyors who use the safety clause, so that in this, as in many other ways, it is much cheaper for an employer to engage an architect of good position.

Mr. Crocker's remarks about "slack" and "full" are amusing, and indicate that the quantities of his experience contain abundance of errors; but hitherto he has found the deficiencies and excesses to balance each other.

It is clearly so much easier for a surveyor, by an interruption or oversight, to omit measuring something shown on the drawings or necessary, than to add anything not shown or intended; that where real mistakes occur, it is nearly always to the disadvantage of the builder. The correction of even a serious mistake at completion forms such a small percentage of the whole cost of a building as to cause no inconvenience to an employer. Whereas it would form a very large percentage of, or perhaps exceed, the whole profit of the builder; and, therefore, it is a gross injustice for any architect to continue the contemptible practice so ably condemned by Mr. Waterhouse.—We are, &c.,

Leeds, Nov. 21. JOHN WOOD AND SON.

#### COLUMNS AND STRUTS.

SIR,—In an article on "Columns and Struts," by Mr. G. Middleton, page 635 of BUILDING NEWS for Nov. 16, there is the following statement:—

"Columns and struts vary in their bearing capacity, not only with their sectional area, but also greatly with their length. This variation does not depend upon mechanical principles," &c.

One would suppose, then, that it must depend upon some other principles—say, æsthetic, financial, constructive, &c. But, a little lower down, a formula (obviously Gordon's formula) is given for computing it by. Does this formula depend upon non-mechanical principles?

This formula is twice quoted (page 635), and in both cases so misprinted as to be useless. Also, no explanation is given of one of the symbols (*k*) therein.—I am, &c.,

ALLAN CUNNINGHAM, Lieut.-Col. R.E.  
S.M.E., Chatham, Nov. 17.

#### THE REVIVAL OF HANDICRAFT.

SIR,—Mr. Morris exhibits a sideboard and also a cabinet at the Arts and Crafts Exhibition, which he tells you in the catalogue are designed by G. Jack. But the two men, Sidwell and Thatcher, who made these pieces of furniture, were not considered or mentioned at all until Mr. Crane asked for their names.

This little incident will amuse those who have heard Mr. Morris's tall talk about the place the handicraftsman is going to take when the Socialists' dream has been fulfilled.

It does not appear to me necessary to wait for the revival of handicraft till we are all unselfish and industrious enough to make the fulfilment of these poetical ideas possible. I think there can be very little doubt that it is principally the decadence of the apprenticeship system which is the cause of the degeneration of the handicraftsman, and that a return to this, coupled, of course, with a demand for artistic work, would very soon bring about a change. Mr. Morris denounces machinery; but, I would ask, cannot beautiful things be made by machinery, and is not the constant repetition of ugliness the fault of the manufacturer, who will not pay for good and fresh designs (and cannot judge them if he would), and the buyers, who only like gaudiness and show, rather than the fault of the machine?

In a lecture on art (reported in your issue of September 17, 1886), Mr. Morris asks "people to notice how beautiful the ordinary arts of life became in the Middle Ages," and says the reason was that the workman of that day was free. Why does not Mr. Morris free the men who do his work, and allow their names to appear instead of their being merged in "Morris and Co." I once heard him say that co-opera-

tion is the thing above all others which will most prevent the spread of Socialism, otherwise one might suppose his workmen to be represented in the "Co." An important movement has recently taken place in co-operative building, the particulars of which I will send you as soon as the firm is registered. They are now doing good and important work in London, and have started under the most favourable circumstances, and I hope that every architect who has the welfare of the majority at heart will do all he can to put work in the way of co-operative builders.—I am, &c.,

CHARLES F. MOXON.

#### A CORRECTION.

SIR,—In the review of the designs submitted in competition for the Battersea Free Library, published in your issue of Nov. 9, you give the credit of the design marked with the motto "Victor" to the late Mr. C. Jones.

Will you please correct this statement, as all the drawings bearing that motto were designed and drawn by me. Mr. Jones's design was that marked "Knowledge," to which you briefly refer in the last paragraph of your notice.—I am, &c.,

HORACE T. BONNER.

29 and 30, King-street, Cheapside, London,  
Nov. 15.

#### ERRATA.

SIR,—OWING to undue haste in the publication of my Address to the Society of Architects [reported in your last issue] I notice, besides several printer's blunders in orthography, two or three errors.

On page 8 of the reprint of my address, the word "consultation" should read "consideration."

On page 9, the words "find himself" should read "be."

On page 10, after "tensile strength of 30 tons" the words "or a safe working stress of 6 to 7½ tons" have been accidentally omitted.

And on page 12, after "somewhere equivalent to 4s. per" the figures "1,000" should precede "cubic feet of gas."—I am, &c.,

W. HOWARD SETH-SMITH.

46, Lincoln's Inn Fields, W.C., Nov. 19.

#### CHIPS.

The chancel of St. John, Isle of Dogs, has been reopened after extensive alterations and improvements. Among the changes are the raising of the chancel; altar of oak with marble slab; side screen carved with figures of patron saint, &c.; east window, by Messrs. Hardman and Powell, and oak pulpit with stone base.

Application has been made to the Board of Trade for permission to construct a new pier and promenade at Littlestone-on-Sea. The corporation of New Romney have approved and passed the plans, which have been prepared by Mr. C. H. Driver, C.E., of Westminster. The plans show a pier and promenade of over 1,200ft. long, with shelter kiosks and a pavilion at the end.

Mr. Francis Ford, who wrote the descriptive work of the schools of art in connection with the Health Exhibition, and who for many years acted as editor of the *Bury and Norwich Post*, was on Monday last elected curator to the Royal Architectural Museum, Westminster, in the place of the late Mr. Isaac Edwards.

Mr. Harry Hems, of Exeter, has completed the equestrian statue of Prince William of Orange, which the Orangemen of Belfast intend erecting on the parapet of Clifton-street Hall in that city. The hero of the Boyne is dressed in the costume of a colonel of Life Guards of the latter part of the 17th century, and this costume and its accessories are in the main carefully copied from the various relics still preserved and known to have been worn by the Prince. The casting into bronze has been intrusted to Messrs. Singer and Sons, Frome, Somerset.

The will of Mr. Arthur Ditchfield, late of 12 Taviton-street, Gordon-square, who died on September 14, has been proved, the value of the personal estate exceeding £23,000. The testator bequeaths his etchings after Charles Jacque and his lithographs by French artists to the trustees of the British Museum for the benefit of the nation, and certain of his oil and water-colour paintings by celebrated artists to the trustees of the national collection at the South Kensington Museum. He also gives £1,000 each to the Artists' Orphan Fund and the Artists' General Benevolent Institution.

A new chapel at Coppelstone, near Crediton, was opened on Friday. It is Gothic in style, and built of local stone with dressings of Hatherleigh stone. Mr. Horne, of Hatherleigh, is the architect, and the cost was £520.

## Intercommunication.

### QUESTIONS.

[9836].—What is a Building Story?—What is a story as applied to a building? The reason I ask is that I know an instance where the conditions of sale stated the building was to be only two stories at the back, and to get over the difficulty, the plans, I understood, were passed for two stories at the back equal in height to the three stories to the front; thus rendering abortive the clause that was inserted in conditions to prevent the blocking of light to adjoining property.—FAIRBANKS.

[9837].—What is a Billion?—Until I wished to know accurately, I innocently thought that this question could have been answered with as much certainty as What is a thousand? But to my surprise, I find that Watson's Dictionary says a million of millions, while Fabister's "Unitary Arithmetic," which embodies the First Book of Arithmetic of the Irish National Board, and has immense use as a school book, gives only one-thousandth part of that number as a billion—viz., a thousand millions. Which is right?—PUZZLED PAT.

[9838].—Building Act Steam Pipes.—Mr. Marsland (district surveyor), in his useful little book "Rules and Regulations Affecting Building Operations in the Metropolitan Area," says, p. 17, "No pipe for conveying heated air or steam under pressure (the italics are his) shall be placed nearer than 6in. to any combustible materials. No pipe for conveying hot water under pressure shall be placed nearer than 3in. to any incombustible materials." For authority he quotes 18 and 19 Vict. cap. 122, sec. 21; and 45 Vict. cap. 14, sec. 16. But on referring to the latter Act I find that pipes conveying steam at "low pressure" are exempted. Now low pressure must mean some pressure (although the Act does not define the meaning of the term), and if there be some pressure, the steam or water must be, to use Mr. Marsland's term, "under pressure"; therefore Mr. Marsland's information is in direct contradiction to the terms of the Act, and his book is so far misleading. Is the subject capable of any further explanation?—R. W.

[9839].—Staircasing and Handrailing.—Can any of the readers of your paper kindly inform me which are the best works that are published on the above subject, and that are most suitable for a working man to study?—ONE WILLING TO LEARN.

[9840].—Appraiser's License.—I shall be glad to hear through the medium of your paper whether an architect and surveyor who occasionally values property for mortgage or purchase purposes, is liable to pay appraiser's license duty. Also, what is the legal meaning of the term "appraiser," and if there is any distinction between that and "valuer"?—DILEMMA.

[9841].—Fireproof Partitions.—Is any reader acquainted with a method of constructing fireproof partitions (to be carried on girders for several stories) that would be lighter than concrete filled in between small iron joists fixed in a vertical position? A description of same would greatly oblige.—P. K.

### REPLIES.

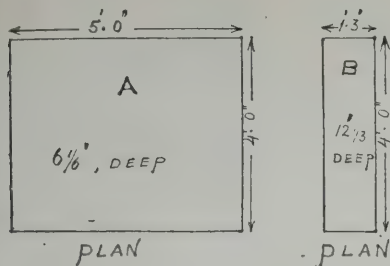
[9826].—Building Leases.—The usual commission is one year's ground-rent; but special terms are arranged, such as £50 for letting a plot at £100 per annum. If the plots are, say, £5 each, and let in two or three plots in each group, then £5 for each plot.—H. L.

[9827].—Airtight Cases.—The steaming of airtight cases is a question of relative temperature. At this time of year, the sun shining into one will steam it—the remedy, to keep off the sun or open the case. In frosty weather, if the shop is warm and the case should be opened if only for a minute; it will steam at once—remedy, keep the shop cool or the case shut. I have known a case to steam without being opened in a shop with no ventilation, gas burning, and the door shut in cold weather. The great thing in all cases is ventilation—in some cases that of the shop, in others that of the case itself. In summer-time, window-cases never steam, as they are mostly protected from the sun, and the inside and outside temperature is fairly equal.—D. P.

[9829].—Bankruptcy of Contractor.—My advice based upon experience in several cases is, do not attempt to finish by employing various tradesmen or workmen under a foreman, but have a detailed specification of the whole of the works required to complete the building (with bills of quantities, if necessary), and invite half a dozen builders to tender for the work.—H. LOVEGROVE.

[9819].—Cement, &c., Measure Boxes.—In answer to above, I beg to give you the following sizes of boxes, viz., A = ¼ of the total contents of aggregates, broken metal, and contains 10½ cubic feet, this box to be 5ft. long, 4ft. wide, 6½ in. deep. B = ⅓ of the total contents of aggregates, sand, and contains 5½ cubic feet, this box to be 4ft. long, 1ft. 3in. wide, 12½ in. deep. C = ½ of the total contents of aggregates, Portland cement, and contains 2½ cubic feet; this box to be 2ft. long, 1ft. 3in. wide, 12½ in. deep. For using above, first place A on a boarded platform or floor, then fill it with broken metal, and use a straightedge to level top. Then place B on A in centre of same, but resting on woodwork. Fill it with sand, using straightedge to level top. On B place C, in centre of same, as before, fill it with cement, and level top. Now carefully lift off C, and the cement will fall down over B and A. Then lift off B, and the cement and sand will fall down upon A. Now lift off A, and the cement, sand, and metal are ready for the first mixing. Let two men turn the aggregate over towards the opposite end of platform, and then back again. Now use water in a water-can with a "rose" on, and turn it over again, and then back again, making it twice dry and twice wet. It is now ready for putting in barrows and wheeling away for use. The platform is to be about 10ft. long and 10ft. wide, of 1½ in. stuff. The boxes to be of 1½ in. stuff, with handles (iron handles preferred), and corners to have hoop-iron straps. The sides of boxes to be plumb or upright, as I find sloping sides are of very little gain, if any; the boxes of course, to have no bottoms. I have allowed 6 in. of a cubic yard to be mixed at one gauging, and this will require four men, two shovels, one rake, one





pickaxe, one garden watering-can, and one wheelbarrow. The sizes given above are inside the box. Allow the extra thickness of  $\frac{1}{2}$  in. all round. The above concrete 8 in. thick, 3 ft. bearing, and 10 ft. long, will safely carry 4 cwt. to the square foot.—TRIED IT BEFORE.

[9830].—**Professional Charges.**—If the job is of fair size, the charge of three per cent. should be a reasonable one.—H. L.

[9830].—**Professional Charges.**—I think two per cent. on the total cost would be a fair charge to your client.—MACKAY.

[9830].—**Professional Charges.**—A. is entitled to charge B. half the usual commission for preparing drawings, specification, and superintending the works, based on the lowest tender, and the full commission for preparing and supplying quantities, &c., which in this instance would be  $\frac{2}{3}$  per cent. for drawings and specification, and 2 or  $\frac{2}{3}$  per cent. for quantities, and in addition to the above, surveying site, levelling, and travelling expenses, according to circumstances. In the "Legal Intelligence" column of this paper there have been from time to time decisions reported where the architect has recovered his fees as above in similar instances. If "Inquisitive" will write to the Secretary of the R.I.B.A., 9, Conduit-street, W., inclosing 3d. and a stamped addressed envelope, he can obtain a printed copy of the ordinary charges of architects for preparing drawings, specifications, and obtaining tenders, with or without the superintendence of works.—A. R. BREDE.

[9830].—**Professional Charges.**—"Inquisitive" will find the Royal Institute of British Architects' scale of charges to be, in the instance he mentions—Preparing plans, elevations, sections, and specification,  $\frac{2}{3}$  per cent. on amount of tender; an additional  $\frac{1}{2}$  per cent. for procuring tenders. For surveying and obtaining levels of site, travelling, and other incidental expenses, according to circumstances, the minimum charge for time being at the rate of three guineas per day. In addition to the above there would be  $\frac{2}{3}$  per cent. on amount of lowest tender for preparing bills of quantities; also lithographer's charges for copies of same. The scale of charges given in Hurst's handbook is slightly in excess of the R.I.B.A., being for preliminary, final, and detail drawings and specification  $\frac{3}{4}$  per cent., and  $\frac{1}{2}$  per cent. additional for procuring tenders—on to which, of course, add for preparing bills of quantities and lithographer's charges; also surveying and levelling site, travelling, and incidental expenses.—SURVEYOR.

[9831].—**Light.**—"Light." I think, is rather in the dark, and his advising architect seems to have kept him there. Myself, I fail to see that this office window is an ancient light at all, or demands any respect legally, unless it, or a similar window, has existed in that same position for 20 years, and that this can be indisputably proved. If it is an ancient light, then as the light that penetrates into that office is obtained equally from the whole surface of glass space in such window, the line drawn should not be from the top, but from the bottom of the glass. This method will give greater benefit to "Light" by allowing him a larger sectional area for his uppermost story. The roof can be brought nearer to the face of the wall and nearer to your neighbour's window without robbing him of lin. of light. By drawing a section both ways, it will, I think, readily be seen.—JOLLYE, 3, John-street, Bedford-row, W.C.

[9831].—**Light.**—If the office window has only been in existence for 15 years—i.e., if no light has been enjoyed through any part of the opening for a longer period, no easement has been acquired. There is nothing, therefore, to prevent "Gwilt" doing as he contemplates so far as the window of the office is concerned.—R. WATSON 29, Fore-street, Kingsbridge.

[9831].—**Light.**—If the building described as an office has been erected fifteen years only, I see no reason why "Gwilt" should not carry his house to any height consistent with the local by-laws and the thickness of the existing wall.—H. L.

[9832].—**Swimming Baths.**—The size of the tank varies very much—some are 50 ft. long and 80 ft. wide. Being fond of swimming, I have visited a great number of baths, and suggest that "Natator" should visit and measure the chief swimming baths in London (for names, refer to London Directory), also the swimming baths at Margate, Eastbourne, Folkestone, Brighton, and Tunbridge Wells.—H. L.

[9832].—**Dimensions of Swimming Baths.**—Below I give, in alphabetical order, the dimensions of a few swimming tanks at public baths, built within the last seven or eight years, with the names of architects or engineers, so far as known. An asterisk denotes that the work has been illustrated in the BUILDING NEWS:—Aberdeen (Jenkins and Marr, architects), 75 ft.  $\times$  30 ft.; Bath City, Royal Victoria (H. J. Garland), 80 ft.  $\times$  30 ft.; Birmingham, Monument-road (Martin and Chamberlain), 80 ft.  $\times$  32 ft. 6 in., and 68 ft.  $\times$  32 ft. 6 in.; Blackrock, Dublin (W. Kaye Parry, M.I.C.E.), two, one 165 ft.  $\times$  100 ft. the other 100 ft.  $\times$  51 ft., both sea water; Bournemouth (Jno. Pollard), 75 ft.  $\times$  30 ft.; Drogheda (Jno. Cotton, Birmingham), 55 ft.  $\times$  30 ft., brine; Dudley (Davies and Middleton), 105 ft.  $\times$  30 ft.; Ealing (Chas. Jones), three, 90 ft.  $\times$  30 ft., 75 ft.  $\times$  25 ft., and 60 ft.  $\times$  24 ft.; Edinburgh (J. Morham, city architect), 80 ft.  $\times$  40 ft.; Garston (J. H. McGovern, Liverpool), 66 ft. 6 in.  $\times$  29 ft. and 51 ft.  $\times$  29 ft.; Glasgow, North Woodside (W. Carrick, city master of

works), 75 ft.  $\times$  40 ft.; Gloucester, now in course of construction (J. Fletcher Trew), two, each 100 ft.  $\times$  46 ft. in hall and 82 ft. 6 in.  $\times$  28 ft. 6 in. actual water space; Grant-ham floating (S. G. Gamble, borough surveyor), 188 ft.  $\times$  33 ft. to 72 ft.; Hampstead (Spalding and Auld), two, each 100 ft.  $\times$  35 ft., and a third 60 ft.  $\times$  25 ft.; Hastings, 180 ft.  $\times$  40 ft., sea water; Ilfracombe (W. M. Robins), 180 ft.  $\times$  56 ft. in hall, 138 ft.  $\times$  34 ft. water area, sea-water; Kensington (T. Verity), 90 ft.  $\times$  60 ft.; Kingstown, Dublin, floating (W. K. Parry), 140 ft.  $\times$  40 ft., sea-water; Ladywell, S.E. (Wilson, Son, and Aldwinckle), two 90 ft.  $\times$  30 ft.; Lewisham (same architects) similar dimensions; Llandudno (B. Nelson, C.E.), 180 ft. by 80 ft. in hall, 158 ft.  $\times$  50 ft. water space, sea water; Manchester, Osborne-road (J. Allison), three, 117 ft. 6 in.  $\times$  28 ft. 6 in., 100 ft.  $\times$  25 ft., and 56 ft.  $\times$  22 ft. respectively; New Brighton winter gardens, Liverpool, largest of three, 144 ft. 6 in.  $\times$  41 ft. in hall, 126 ft.  $\times$  23 ft. 6 in. water area, sea water; Newcastle-under-Lyme (Sugden and Sons, Leek), 84 ft. 6 in.  $\times$  39 ft. 6 in.; Pendleton (L. Booth, Manchester), 75 ft.  $\times$  27 ft.; Pimlico, Buckingham Palace-road (Lee and Smith), 90 ft.  $\times$  40 ft.; Poplar, E. (J. and S. F. Clarkson), 75 ft.  $\times$  26 ft.; Putney (Lee Brothers and Pain), 100 ft.  $\times$  30 ft.; Rotherhithe (Geo. Elkington and Sons), two, 90 ft.  $\times$  30 ft. and 84 ft.  $\times$  30 ft.; Silford (A. Jacob), two, 81 ft.  $\times$  24 ft. and 31 ft.  $\times$  45 ft.; Skegness (Jas. Whitton, Lincoln), 63 ft.  $\times$  30 ft. and 40 ft.  $\times$  30 ft.; Westbury (Halliday and Anderson, Cardiff), 68 ft.  $\times$  25 ft.; Weymouth (Crickmay and Son), 82 ft.  $\times$  38 ft.; Windsor (Byrne and Crombie), 66 ft.  $\times$  30 ft.; and Yeovil (Jno. Johnson, London), 92 ft.  $\times$  28 ft. As a rule the cost of public baths may be approximately cubed at 6d., plus a small allowance for fittings.—EAST ANGLIAN.

[9833].—**Wooden Houses.**—Unless "Pig in a Poke" lives in a very remote region, I advise him to have nothing to do with importing wooden houses, as most local Boards of Health have regulations prohibiting such erections, and in the London district the setting up of a wooden structure will soon insure a visit from the district surveyor, and perhaps a summons.—H. L.

[9834].—**Wind Force.**—I advise "A. S. J." to study Professor Rankine's "Applied Mechanics." The pressure of the wind on the wall may be taken as 55 lb. per square foot equal 32 lb. per square inch. Refer also to Tarn's "Science of Building," page 13.—H. L.

## CHIPS.

The new bank of the Birmingham and Dudley District Banking Company at Dudley has just been completed. The front is of red and buff terracotta, from King and Co.'s Works, Stenlands. The back is of pressed bricks. On the ground-floor are the banking-room, manager's room, and house and staircase. The contractor for the building was Mr. John Groves, Shrewsbury. The foremen on the work were Mr. Joseph Cooper and Mr. George Squires. On Thursday evening, the 15th inst., a supper was given to the workmen employed on the bank at the George Hotel, Ludlow.

A handsome clock has been erected in the Taunton town council chamber. The case, a beautifully carved one, has been made by Mr. Crosse, cabinetmaker. The design for the case is the work of Mr. George C. Strawbridge, M.S.A., architect, and was prepared to meet the requirements of the room.

The foundation-stone of new mission buildings in South Hill-road, Toxteth Park, Liverpool, was laid on Tuesday. The mission buildings will consist of Old Woolton Church rebuilt (this old edifice having been pulled down and the materials transferred to Toxteth), and they will include a mission room to accommodate 500 persons, a parish room to hold 180 persons, and two classrooms and vestry. There will also be procured a dwelling-house, at one time occupied by the late Dean Howson, conveniently situated for the clergyman's residence. Mr. George Bradbury is the architect, and Messrs. Thornton and Sons are the builders.

The value has been declared at £38,763 5s. 3d. of the personal estate of the late Miss Isabella Constable, who died on the 13th of August last. Five pictures by her father, the late John Constable, R.A., including "The Cenotaph," "Harwich," and "Flatford Mill, on the Stour," are to be presented to the National Gallery, and five others, including "Old Sarum" and "Stonehenge," "Gillingham Mill" and "Trees at Hampstead," to the South Kensington Museum, as the gift of Louisa Maria, Isabel and Lionel Bicknell Constable.

Considerable additions have been made to the brewery of Messrs. Mann, Crossman, and Paulin, Mile End, and special attention has been paid to the ventilation, which is carried out on the Boyle system.

## LEGAL INTELLIGENCE.

THE ALLEGED BUILDING FRAUDS IN BIRMINGHAM.—At the Birmingham Police-court on Friday, Edward Cullen, who is also known by a number of aliases, was charged with committing a series of frauds upon various people in the town. Mr. Stubbins, for the prosecution, said that in August, 1887, prisoner called upon Messrs. Ryland and Alder, candlestick manufacturers, and opened negotiations with the first named about the purchase of some freehold land at King's Norton. The prisoner explained that his name was George Smith, and that he was a commercial traveller. He further informed Mr. Ryland that he was residing at Fern Villa, St. Saviour's-road, Leicester, but wanted to build a house in or near Birmingham, which would enable him to get home with greater facility at night. Subsequently prisoner called upon Mr. Hale, architect, to whom he introduced himself as a man of means who had quite recently concluded large building operations at Leicester. In support of this he produced a number of plans, and his statement gained credence. Mr. Hale was then instructed to draw up plans for two houses to be built at King's Norton, and afterwards he undertook to receive tenders for the actual work of erecting the residences. Mr. Clulee, of King's Norton, was the successful competitor. The accused, as references, gave the address of "E. Cope, Leicester-street, Derby; E. Cullen, Jarro-won-Tyne; Frederick Grant, Orchard-street, Manchester." All these were bogus, but the accused overcame the difficulty by a strategic effort. Mr. Clulee and Mr. Hale wrote to the addresses, and simultaneously prisoner wrote to the postmaster of each town, saying that it had been his intention to purchase a business in the respective place, but he had altered his mind, and would, therefore, esteem it a favour if all letters arriving in his name would be redirected to Birmingham. This request was complied with, and Mr. Clulee received the following references:—"I have much pleasure in testifying to the satisfactory dealings I have had with Mr. G. Smith. My contract with him was £1,900.—E. COPE." "Mr. Edward Cullen" says: "I have contracted with Mr. G. Smith. Should be most willing to deal with him again. His payments are not prompt but sure." The next thing the prisoner would have to answer was a charge preferred by Miss Macdonald, who owned land in the Stratford-road. During 1887 prisoner called upon Messrs. Perry, the agents for Miss Macdonald, and represented that he was a licensed victualer. The result was that Mr. B. Clarke was induced to draw up a lease which Miss Macdonald signed. In both cases prisoner made arrangements with the builders to pay the first instalment when the buildings had reached a certain stage of erection. Just before the stipulated progress had been made, however, he borrowed £150 from Mr. Ryland on the work, and retired from the scene. The whole of the prisoner's statements were false. At the time he made these negotiations he was carrying on the business of a small huckster in Lister-street, and only a short time before had been liberated from Worcester Gaol, where he had undergone twelve months' imprisonment. Further than this, the prisoner would be charged under the Debtors Act with getting credit from Mr. Hale and Mr. Bradley by false pretences. In answer to Mr. Brady, who appeared for the defence, Mr. Bradley said it was quite common for men to obtain leasehold ground, and mortgage the property as it was being built. Evidence having been given in support of Mr. Stubbins's statement, the case was adjourned for a week.

RE F. S. KING.—Under a receiving order made on the 17th September in the case of Franklin Sydney King, of Billiter-square-buildings, and 62, Mark-lane, City, also of Goulston-street, White-chapel, and Addiscombe-road, Croydon, builder and contractor, accounts have now been filed showing gross liabilities £96,069, of which £21,115 are stated to be unsecured, and £68,052 fully secured; the assets being returned at the same amount as the liabilities, subject to realisation. The debtor (as reported by the Official Receiver) states that on the death of his father in 1878 he became co-executor of the estate (which was placed in Chancery in 1879), and sole proprietor of a business previously carried on by them in partnership. He has prepared an approximate statement of his assets and liabilities as at 1st of October, 1885, showing a surplus at that date of £23,337. On the 5th of October, 1885, he sold his interest in certain buildings in Billiter-street to a company for £17,500 in cash and shares, and became guarantor for the payment of dividends until Michaelmas, 1888. The debtor has intimated his intention of submitting a scheme of arrangement to his creditors.

THE REVERENDS IN ST. PAUL'S.—In the Queen's Bench, London, on Saturday, and again on Tuesday—before the Lord Chief Justice, Mr. Baron Pollock, and Mr. Justice Maclady—arguments were heard in the case of the Queen against the Bishop of London. A rule nisi had been obtained calling upon the Bishop of London to show cause



why a writ of mandamus should not issue commanding him to transmit a copy of a representation to the Dean and Chapter of St. Paul's Cathedral, and further proceed thereon in accordance with the Public Worship Regulation Act of 1874, or in the alternative why he should not be directed to proceed to consider the whole of the circumstances of the case affecting such representation without considering any other circumstances. The Attorney-General, in showing cause against the rule nisi, stated that the representation set out that the Dean and Chapter had, in January, 1888, introduced into St. Paul's Cathedral and set upon the reredos an image or sculptured subject representing Our Lord upon the Cross, the image being constructed so as to have the appearance of a sculptured crucifix, such as was used before the Reformation. Further, it was complained that a similar representation of the Blessed Virgin Mary with a Child in her arms had been placed upon the reredos, and it was contended that such images tended to encourage ideas and devotion of an unauthorised and superstitious kind. The Attorney-General, who cited numerous authorities, submitted that, the Bishop having exercised his discretion and stated his reasons, his decision was final, and therefore a mandamus ought not to be issued. Sir H. James, in support of the rule, contended that the figures in question constituted a breach of the law, and were in contravention of the 22nd Article of the Church, and if the images created a danger of idolatry the promoters of the suit had under the law the right to complain. The legality or the illegality of the images could not, however, be determined by this Court, and his only request was that the matter should be determined by the proper tribunal which had been created by statute. Their lordships reserved judgment.

### PARLIAMENTARY NOTES.

**THE METROPOLITAN BOARD OF WORKS REPORT.**—Lord R. Churchill asked whether the attention of the Government had been directed to paragraph 94 of the Royal Commission on the Metropolitan Board of Works; and whether Her Majesty's Government would undertake to propose to Parliament next Session the legislation recommended in the said paragraph. Mr. W. H. Smith said that the attention of Her Majesty's Government had been drawn to paragraph 94 in the Report of the Royal Commission, and they sympathised with the objects sought to be obtained. The subject was being carefully examined, and he hoped that it would be possible for the Government to propose measures to Parliament next Session. He would also refer to the question that the noble lord had put to the Home Secretary as to whether the attention of the Public Prosecutor was being directed to the said Report with a view to taking criminal proceedings against certain parties mentioned therein. The Report was, in August last, submitted to the Treasury Solicitor and the Law Officers of the Crown, with a view to taking criminal proceedings against the persons most seriously reflected on by the Report, and who were not protected by an indemnity. The Law Officers, however, advised that, in the existing state of the law, there was not sufficient evidence to justify a prosecution.

**METROPOLITAN BOARD OF WORKS LEASES.**—Mr. J. Rowlands asked whether the Government would take such action as might be necessary to annul all the leases granted by the Metropolitan Board of Works which, according to the evidence taken before the Royal Commission, had been obtained by bribing the officials, or giving colourable employment to members of the Board. Mr. W. H. Smith said that it was not in the power, nor did he hold it to be the function, of Her Majesty's Government to take the steps suggested by the hon. member. If there were any legal grounds for annulling the leases granted, it rested with the local authority to take action in the matter.

### WATER SUPPLY AND SANITARY MATTERS.

**TAUNTON.**—A special meeting of Taunton Town Council was held on Friday to consider a report of the sanitary and drainage committee with reference to the proposed extension of the sewage works, at an estimated cost of £4,000. The committee presented their report of the additions which they recommended for the more efficient management of the sewage outfall works, and which they considered necessary to prevent a recurrence of the escape of sewage into the river lately complained of, caused by overflow of the receiving tank with the normal flow of the sewers, and also to obviate the necessity of continuous day and night pumping, and consequent heavy expense. The recommendations were adopted by nine votes to six.

## Our Office Table.

AN excellent proposal was recently made to the Metropolitan Board of Works—namely, that that body should, in one of its Bills to be introduced next session, insert a clause giving power to the Board, when forming new streets, to provide that all the ancient lights and other easements interfered with by the new buildings erected shall be dealt with by compensation, and not by injunction. Such a clause ought long ago to have been adopted by the Board, and would have prevented the restrictions on building caused by rickety and tumble-down structures claiming ancient lights, such as we see in Bream's-buildings, Charing Cross-road, and other new thoroughfares. Unfortunately the suggestion comes too late to be acted upon this session, and so the old inconvenience may be repeated in the street widenings projected to be undertaken in Kensington and Deptford under the Bill about to be promoted.

WE regret to announce the death of Mr. Pearson Barry Hayward, a well-known architect of Exeter, after having just completed his fiftieth year. He was the son of Mr. John Hayward, of Exeter, now the senior architect in the West of England. For many years they have practised together under the style of Hayward and Son; but latterly Mr. Tait, of London, has joined partnership, and the firm are at present known as Hayward, Son, and Tait. After serving his articles, Mr. Hayward was for some time with Messrs. Hadfield, Weightman, and Goldie, of Sheffield (now Hadfield and Son), and, returning to Exeter, built, in conjunction with his father, the Albert Memorial Museum, then and still certainly by far the best modern building in his native city; it was illustrated by elevation and plan in the BUILDING NEWS for Jan. 3, 1874.

THE death is announced from Southport, in the 80th year of his age, of Mr. William Bell, of Park Croft, Cheetham Hill, first surveyor of ecclesiastical dilapidations for the diocese of Manchester. Mr. Bell was born in 1809, at Heaton Mill, Blackley. On leaving school he was articled to a local surveyor. His busiest time in this profession was during the "Railway Mania," when he worked day and night for weeks together in surveying and getting out plans of the multitudinous lines which were then projected in various parts of the kingdom. On the passing of the Ecclesiastical Dilapidations Act, 1871, he was appointed by the rural deans, with the concurrence of Bishop Fraser, first surveyor under that Act for the diocese of Manchester. The duties of this office he discharged with efficiency until his resignation (owing to increasing years) last year.

AN application will be made to Parliament in the ensuing session for an Act to authorise the taking of certain lands and houses, by agreement or compulsion, in the parish of St. Margaret and the close of the Collegiate Church of St. Peter, Westminster, "for the purpose of opening out a view of Westminster Abbey, the Chapter House, and other buildings, and to appropriate a portion of the site so cleared for the erection of a monumental chapel in connection with Westminster Abbey," and in improving the approaches to the Abbey and other property. The lands and houses proposed to be taken are "all the lands, houses, buildings, streets, roads, and premises within the area bounded on the east by Old Palace-yard and Abingdon-street, on the south by College-gardens, on the west by Dean-street, and on the north by Poet's-corner and Westminster Abbey."

### MEETINGS FOR THE ENSUING WEEK.

**MONDAY.**—Royal Academy. "Chemistry," Lecture No. 6, by Prof. A. H. Church, F.R.S. 4 p.m.  
Surveyors' Institution. 8 p.m.  
Society of Arts. "Light and Colour," Cantor Lecture No. 1, by Capt. W. de W. Abney, C.B., F.R.S. 8 p.m.  
Leeds and Yorkshire Architectural Society. "16th Century Furniture and Woodwork," by A. Marshall.  
**TUESDAY.**—Society of Architects. "The Development and Further Organisation of the Society of Architects," by Frank Baldwin. St. James's Hall, Piccadilly. 7 p.m.  
Institution of Civil Engineers. "The Witham New Outfall Channel and Improvement Works," by E. Evelyn Williams, M.Inst.C.E. 8 p.m.

**WEDNESDAY.**—Society of Arts. "The Phonograph," by Col. Gouraud. 8 p.m.  
**THURSDAY.**—Builders' Benevolent Institution. Dinner at Carpenters' Hall. 6 p.m.  
Edinburgh Architectural Association. "Castles of the Western Highlands and Islands of Scotland," by D. McGibbon.  
**FRIDAY.**—Architectural Association. "Development of Irish Architecture from Early Celtic to 18th-century Work," by J. L. Robinson, A.R.H.A. 7.30 p.m.  
Institution of Civil Engineers. "The Covered Service Reservoir at Southampton," by E. T. Hildred; "New High-Level Reservoir at Baling," by H. Ashley. 7.30 p.m.

**Architectural Association 9, Conduit-street, W.**—Nov. 30 Submission for approval of By-laws regulating Affiliation of Glasgow and Birmingham Architectural Associations. J. L. Robinson, Esq., A.R.H.A., on "The Development of Irish Architecture." 7.30 p.m.

### National Registration of Plumbers.—Plumbers Registered since Oct. 1, 1888.

**LONDON MASTERS.**  
Allison, B., 57, High-street, South Norwood, S.E.  
Milan, J. W., 93, Park-road, Haverstock-hill, N.  
Morris, S., 54, New-street, Kennington Park-road, S.E.  
Myring, J., 69, Abbey-road, St. John's Wood, N.W.  
Pratt, J. L., 103, Burghley-road, Highgate, N.  
Thomas, H., 246, Upland-road, East Dulwich, S.E.  
Wheeler, G. J., 3, Russell-road, Wimbledon.

**LONDON JOURNEMEN.**  
Allison, R., 66, Hatfield-street, Blackfriars, S.E.  
Bostel, W., 13, Elford-road, Drayton Park, Holloway, N.  
Chandler, J. A., 25, Hamilton-road, Old Brentford, W.  
Coleman, J., 18, Stonefield-street, Barnsbury, N.  
Cooper, W., 1, Guernsey-villas, Beachcroft-road, Leytonstone, E.  
Cruttenden, F., 8, Frognaal-villas, Chislehurst, S.E.  
Gent, G., 11, Brigadier-hill, Enfield, N.  
Golsby, W. T., 83, Ravensbourne-street, St. John's, Deptford, S.E.  
Gould, W., 32, Warlock-road, Paddington, W.  
Jones, W. R., 20, Nelson-street, South-street, Ponder's End, N.  
Mansfield, C., 24, Abyssinia-road, Battersea, S.W.  
Mitchell, J., 104, Albert-road, Kilburn Park, N.W.  
Simpson, J. B., 289, Shakespeare-road, Herne-hill, S.E.  
Stacey, E. J., 10, Gee-street, Clarendon-square, N.W.  
Stevens, J. A., 29, Warriner-gardens, Battersea, S.W.  
White, W., 31, Lowden-road, Herne-hill, S.E.  
Young, R., 66, Lillington-street, Pimlico, S.W.

**PROVINCIAL MASTERS.**  
Anderson, J. F., 2, Bath-street, Aberdeen.  
Auchinloss, M., Church-street, Moffat, N.B.  
Auty, J., Huddersfield-road, West Town, Dewsbury.  
Beaven, W., 132 and 133, Westgate-street, Gloucester.  
Beddeson, H. F., High-street, Egham.  
Berry, W., 7, Kingsmead-square, Bath.  
Best, J., 23 and 24, Old Town-street, Plymouth.  
Bottomley, F., Savile-road, Savile Town, near Dewsbury.  
Dare, T., 3, Julia-terrace, Burnham, Somerset.  
Dawkes, W., 69, High-street, Leamington.  
Dunn, W. H., 7, Queen-street, South Shields.  
Dyson, A. B., 68, King Cross-street, Halifax.  
Hepburn, J., Well-street, Moffat, N.B.  
Hollier, W., Sheepwash-lane, Great Bridge.  
Horsfall, F., Newcombe-street, Elland, Yorkshire.  
Hoskin, W. H., Fore-street, Plympton.  
Mason, G. H., 54, High-street, Skipton.  
Mercer, T., 83 and 85, George-street, Stranraer, N.B.  
Moorhouse, A., Market-place, Kirkby Lonsdale.  
Morris, S., Crown Point, Denton, near Manchester.  
Morrison, R., 39, North-street, Scarborough.  
Park, T., 2, Fox-street, Preston.  
Raworth, W., 160, Waterway-street, Nottingham.  
Stancer, H., 112, Witham, Hull.  
Underwood, J., 23, Free School-lane, Leicester.  
Walshaw, J., 95, Commercial-street, Batley, Yorkshire.  
Wilks, G. B., Westbourne, Emsworth.

**PROVINCIAL JOURNEMEN.**  
Ashton, C. W., West Green, Cottingham, Hull.  
Badger, W. J., 3, Clyde-street, Adamsdown, Cardiff.  
Cartwright, T., 51, Fox-street, Sheffield.  
Casely, E. J., Cleeve House, Fraser-street, Bedminster, Bristol.  
Craven, T., 243, Clifton-terrace, Fratton-street, Landport.  
Evans, R., 3, Exmouth Villas, Church-road, Teddington.  
Finden, J., care of J. Warner, High-street, Alton.  
Garthwaite, G. B., 93, Corporation-road, Middlesbrough.  
Gillam, A., 16, Phillip-street, Hoole, Chester.  
Hall, W., 18, Bengal-street, West Hartlepool.  
Hinchcliffe, G., 103, Bevois-street, Southampton.  
Hanson, J. L., 47, Hind-street, Stockton-on-Tees.  
Leat, H. C., 1, Richmond-street, Totterdown, Bristol.  
Ledger, W., 8, Villiers-street, West Hartlepool.  
Loose, A. G. M., Audley End, Saffron Walden, Essex.  
Maisey, W. H., Oxford-street, Woodstock, Oxon.  
Martin, L. P., 54, Cobourg-street, Plymouth.  
Mayberry, T., 9, Warwick-road, Sutton.  
Mercer, W., 85, George-street, Stranraer, N.B.  
Miles, R., 19, Rushmore-place, Leamington.  
Oram, G., Manor Farm Cottage, Aldershot.  
Pack, R. B., West Hyde, Luton, Hoo Park, Luton.  
Parkinson, J. F., 33, Crown-street, Kingston, Portsmouth.  
Pinnick, W. R., 32, Rochester-terrace, Northam, Southampton.  
Fistell, W. H., 1, West-street-place, Fisherton, Salisbury.  
Press, W. J., Abingdon-street, Burnham, Somerset.  
Prigg, A. E. J., Grittleton, Chippenham.  
Roberts, G., Woodside Cottages, Tolworth, Surbiton.  
Serridge, H. B., 18, Wellington-street, Plymouth.  
Sharp, J. A., 16, Queen-street, Lumb-lane, Bradford.  
Skinner, T., 47, Mill-street, Hereford.  
Sloan, J. McH., 3, Victoria-street, Newton Stewart, N.B.  
Smith, J., High-street, Annan, N.B.  
Snelling, J. W., Normanhurst Court, Battle.  
Stutchberry, E. F. J., 13, Amoy-street, Bedford-place, Southampton.  
Webb, A. H., 10, Beaufort-street, Bournemouth.  
Wells, J., 4, Mount Zion-place, Brighton.





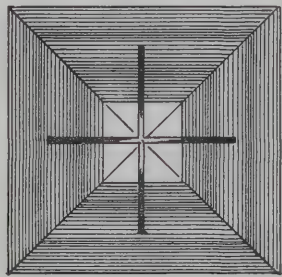
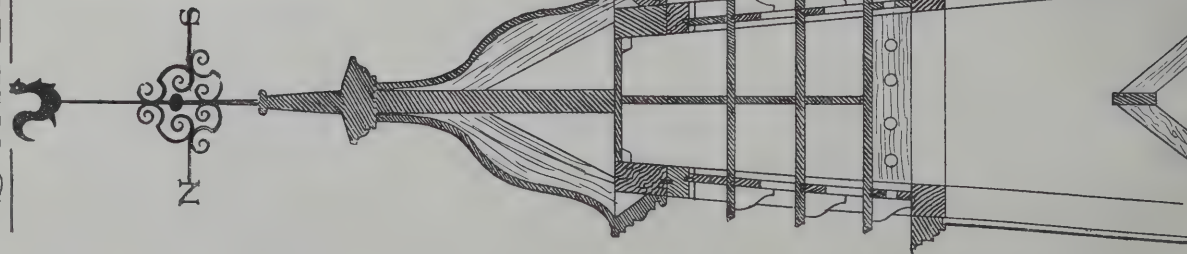


STABLES AND COACHMAN'S HOUSE

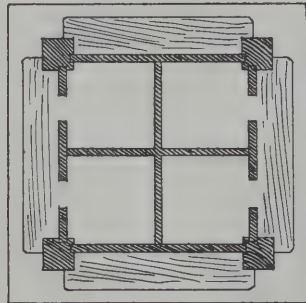
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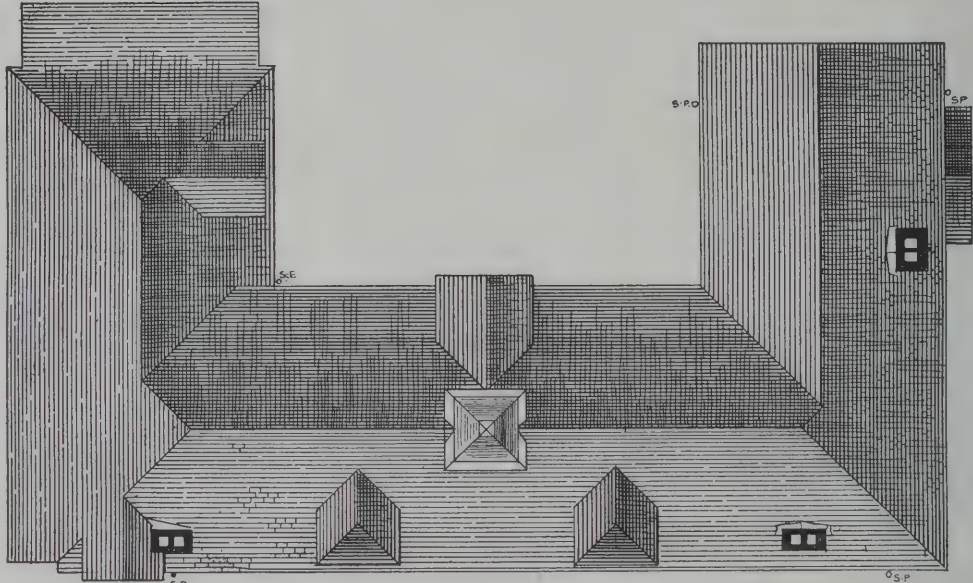
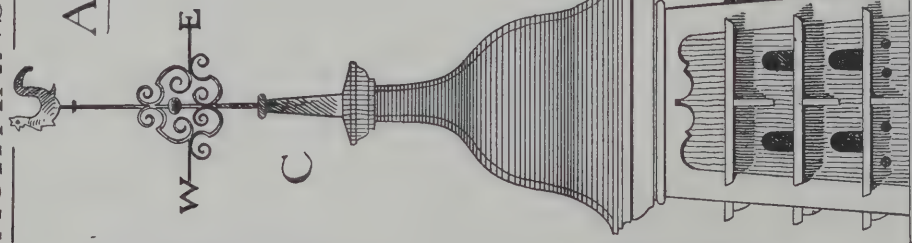
MAURICE B. ADAMS F.R.I.B.A.  
Architect



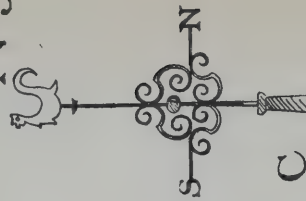
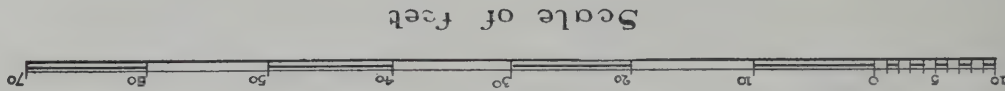
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Plan B

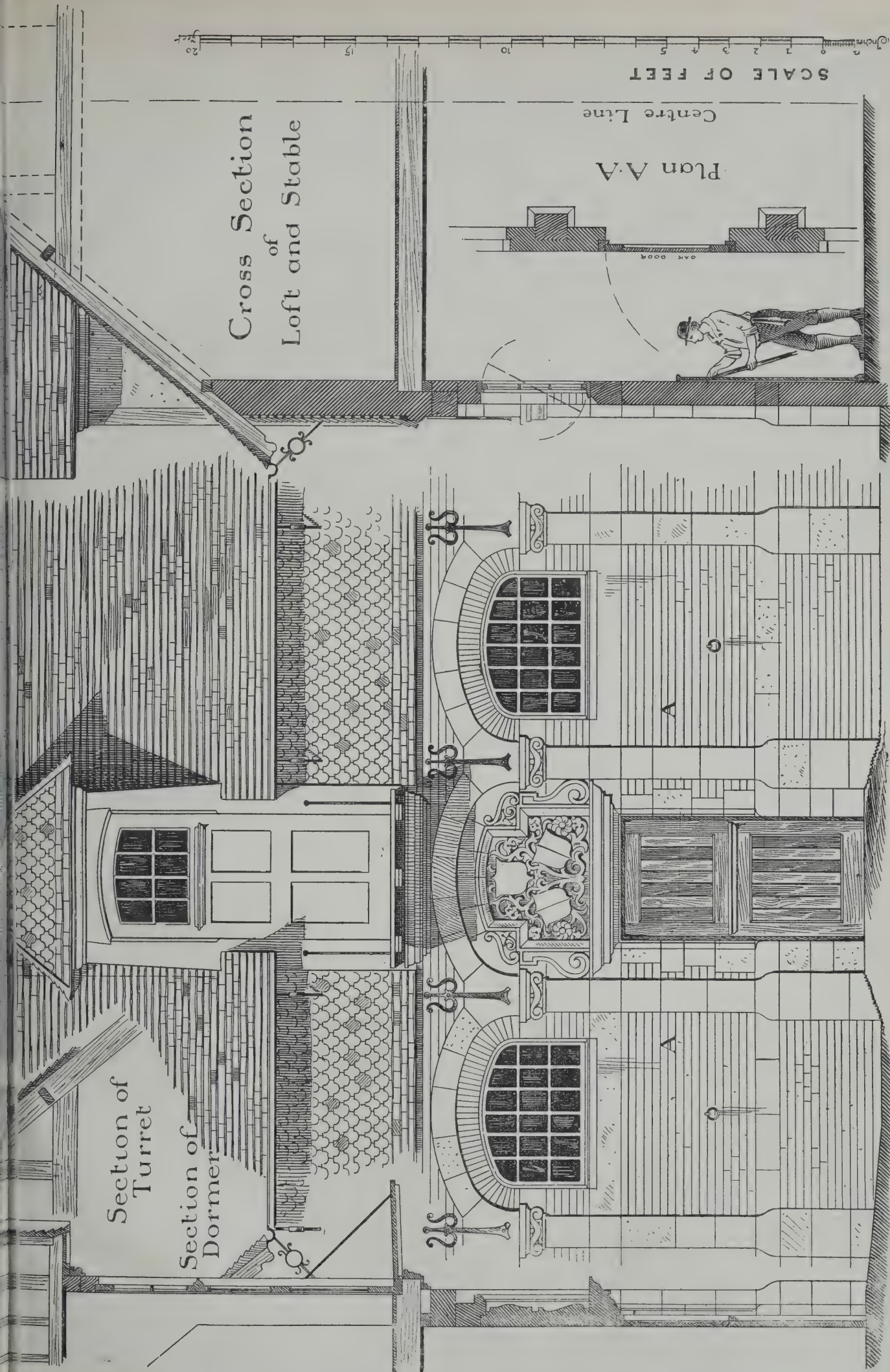


Roof Plan



Side of Turret











# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1769.

FRIDAY, NOVEMBER 30, 1888.

## COMMISSION FOR DESIGN WITHOUT SUPERINTENDENCE.

WHAT should an architect charge for partially rendered services? The singular diversity of answers to this question can be verified by an appeal to the pages of our own journal or to members of the profession. Without knowing the class of building, or its size, the time employed in preparing designs and plans, we can hardly conceive any reasonable reply. It is as reasonable as asking what a medical practitioner ought to charge in attending a patient suffering from a malady the nature of which is not known. Adopting the generally received schedule of remuneration, in which the different stages of the architect's labour are fractionally set down, it is assumed that if the design is completed and the drawings and specification are ready for handing over to the builder or contractor, the architect is entitled to receive half the usual commission of five per cent., should the works not be carried out. Little objection can be raised to this division of the percentage in ordinary cases, and by ordinary cases we mean the preparation of designs for every-day buildings, like houses, shops, warehouses, and the like, when the skill and labour required in the design may be said to be fairly balanced by that of superintending the work during its execution. But this division is certainly not always a fair one. The five per cent., even if we accept it as a reasonable remuneration, is not divisible by two in every kind of service rendered by the architect. To take a school. Would it pay him to receive half the commission on the lowest tender for revising plans and preparing all the necessary drawings and specifications for a group of school buildings costing £3,000? A great deal more than half the labour is spent in arranging the plans to meet the requirements of the Committee of Council on Elementary Education, in determining the length and width of the rows of desks, the classroom fittings, the lighting, and other details. When these have been adjusted and the drawings prepared, and duplicates made for the Government Grant, quite two-thirds of the architect's work has been performed. The artistic function in any special work renders the division still less satisfactory. In elaborate interior fittings and decoration, for example, how can the architect hope to recoup himself for his services at a commission of 2½ per cent. on the cost? Suppose he has designed a redwood staircase, 10 per cent. on the net cost, say, of £500 would not be remunerative—it would scarcely be the price which a third-rate interior would charge for a picture, and yet there would not be many young architects who would charge more than 5 per cent. for design not carried out. We know there is a higher scale in the schedule for works in which skilled labour is largely employed; but it appears to be almost a dead letter in very many instances. Charges "regulated by special circumstances and conditions" are not sanctioned by the Courts, as many have found out to their cost. The usual 5 per cent. commission appears to be the only customary rule of charging, and is the only one which the public understand. The architect is generally engaged on that assumption, and the exceptions of charges for special services, which he has all along been informed, on the highest authority, he can demand, have not yet received the sanction

of law necessary to give them acceptance. When a building owner employs an architect to make a design for a villa at the generally assumed percentage, he does so with the conviction that if he alters his mind and does not build, he will have to pay only a small proportion of that commission. The house may be one of a high class, the design may have entailed a great deal of thought in plan and consultation, the details may have been elaborate; yet if the client abandons his intention of carrying it into effect, the skill and labour are valued as so much waste-paper and ink—a quantity of mechanical drawing and writing that cannot be worth much, and may be paid for by a few pounds. The design is absolutely worthless in his eyes.

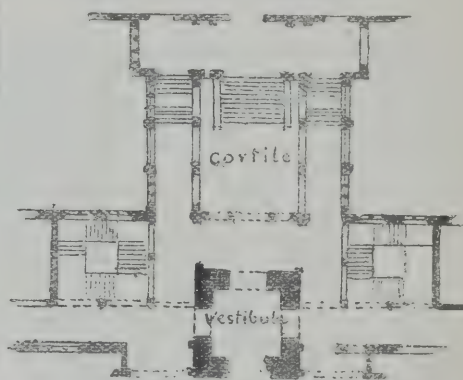
So common is the public impression that an architect cannot charge much for unexecuted designs, that we have the repeated question, "What is a fair charge to make for preparing drawings and specifications, and sometimes quantities, for work abandoned?" These questions are astonishing to those who know the usual custom and adopt the schedule; yet they show that the inexperienced provincial architect still hesitates to offend the preconceived notions of his client, and is often willing to accept a smaller rate of commission than he legally can demand. Thus one correspondent last week replies: If the job is of fair size, the charge of 3 per cent. is reasonable; another thinks that 2 per cent. on the cost is a fair charge. These were replies to the question, What is a fair commission to charge for plans, specification, and quantities after tenders have been invited, no superintendence being required by the client? They speak for themselves. One correspondent enlightens the querist by telling him there would be 2½ per cent. for plans and specifications, ½ per cent. for obtaining tenders, in addition to 2½ per cent. on lowest tender for bills of quantities, and charges for lithography, surveying, and obtaining levels of site, travelling and incidental expenses. These items, it is needless to say, are all fair and reasonable; but as long as architects are found willing to prepare all plans and documents at 2½ per cent. and forego the charge for quantities, the public will continue to make their own deductions. The same writer points out that the scale given in Hurst's "Handbook" is in excess of the R.I.B.A. scale—viz., for preliminary, final, and detail drawings and specifications 3½ per cent., and ½ per cent. for procuring tenders, making in all 4½ per cent., which, if we add for quantities and other expenses, would considerably swell the amount. This higher scale is adopted by many in the profession for abandoned work, and is certainly not an unreasonable one for designs in which skilled labour is largely represented. On the whole, it appears that the arbitrary division, which is generally accepted for partial services, or for the architect's skill without supervision, allows a very unfair proportion of the commission to go for the superintendence, while the skill and art displayed in the design is inadequately paid at the same rate. Where the cost of the buildings is chiefly for material, as in the factory and warehouse class, or for repetition, the usual division is a fair one; but where, on the contrary, the skill of the architect and workmen is concerned, we fail to see the justice of making design and superintendence equal, or remunerable at the same rate.

The only way by which an architect can make unexecuted work, or a building supervised by another, remunerative, is to charge for all preliminary sketches and journeys at a high rate; though we know the client often resents the idea of paying for sketches which have not been adopted, or for anything he regards as an extra. It is far better to adopt a sliding scale of charges for different kinds

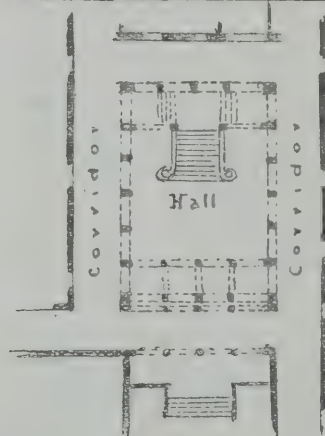
of buildings when the supervision of the work is not required, or is handed over to another.

## HALLS AND STAIRCASES.—X.

OF the class of palatial staircase halls found in Italy and France we have few examples in England; some of the noblest designs have been allowed to remain on paper and in the fertile imagination of the architect. Some finely-conceived instances of staircases and halls will be found in one or two recent competition designs. Those submitted for the Admiralty and War Offices contained a few handsomely-treated staircases. We cannot, for instance, pass over the admirable interior views of the grand hall and staircase to Messrs. Aston Webb and E. Ingress Bell's design for that building. Three great arcaded halls were shown on the plan, the largest and grandest being at the north-west corner (plan 23). This was a hall of oblong proportions of at least 30ft. in width and 45ft. long, with glazed roof, and surrounded on its four sides by corridors or galleries, which were opened to the hall by four tiers of colonnades and arches four bays wide and six long, each tier being varied in design. At one end of this hall a central



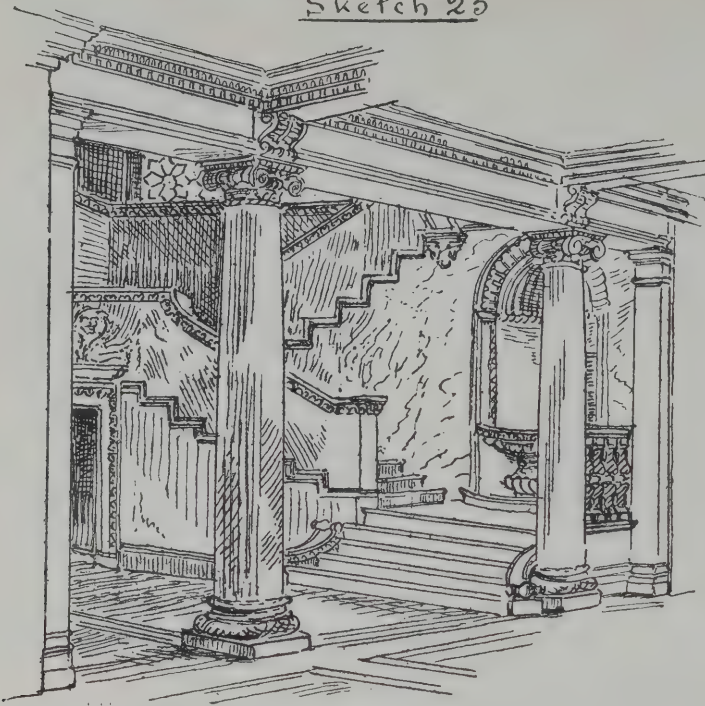
Plan 23. Open-Galleryed Hall.



flight supported by handsome turned masonry balustrades, and two wing flights at right angles thereto, gave access to the first floor. The bottom ramps were terminated by bold scrolls, with sculptured winged horses. Half-way up the flight were pedestals with figures representing Gunnery and Navigation, and a second pair of seated figures terminated the flight on the pedestals forming the upper newels. The side or wing flights were carried on semicircular arches with carved spandrel panels. If carried out it would have been a noble staircase hall, resembling a glazed cortile. The corridors surrounding it on each of the four floors would have been well lighted by this arrangement. The design of Messrs. Leeming and Leeming also showed the staircase hall placed at the corner between the



Sketch 23



lines of corridors with open piers and arches. Another ingenious arrangement was shown in the plan of Messrs. Stark and Lindsay's design, in which the stairs were placed on one side of the entrance hall, lighted by an area, and contained between two lines of corridors (see plan 20, p. 596 *ante*). The designs sent in for the Imperial Institute at South Kensington afforded their authors an opportunity of displaying their architectural powers in grand central reception halls and staircases. Mr. T. E. Colcutt's plan, which was illustrated in the *BUILDING NEWS* of July 1, 22, 29, 1887, exhibits a centre vestibule with cortile beyond, in which a wide centre flight is placed. The arrangement we show in plan 22. Messrs. Aston Webb and Ingress Bell's plan showed a double staircase on each side of a corridor leading to a reception hall in the centre axis. Mr. Blomfield had a large octagon entrance hall, behind which were two staircases; but the most sumptuous arrangement was that in Messrs. T. N. Deane and Son's plan, in which a central octagonal hall was placed in the axis of the main portico and vestibule, with staircases at the outer angles.

A very good example of a modern Gothic vaulted staircase hall is seen at St. James's Hall, Piccadilly. The centre flight is wide, and occupies the whole width between the rows of shafted piers which divide the stairs from the side corridors. These pillars carry pointed arches, and the ceiling is groined; the vaulting is continued at the same level along the side corridors, that over the staircase being raised. The balustrading of the centre flight is made to stop against the pillars at intervals, and there is a landing half-way up. Altogether, the effect at night under gaslight is satisfactory, the stairs are made to form an integral part of the hall structure, and the ascent is easy. The vaulted hall assists to mitigate the raking lines of a stairway, and the piers can be made to align with the main flight, the side aisle-like corridors concealing it partially, and giving access to the other rooms in the rear on the ground level.

Our sketch represents a recently-built staircase for the house of Mr. W. Rockefeller, New York, from the design of Mr. Thomas Hastings, architect, of that city. The staircase here forms a smaller hall or recess to the large hall. The stairs are carried and flanked by solid ramped parapets, lined with marbles, and the design exhibits a classical and refined taste. The first short flight of five

steps to a quarter landing, balustraded off from the hall with the alcove, is easy, elegant, and graceful. We like, too, the simple, expressive ornamentation indicating the ends of the stairs. The solid ramped balustrade is rather a severe treatment for a domestic residence, that can only be tolerated by the beauty of polished marbles or onyx surfaces, with their charms of colour, figure, and translucency. The staircase of the Holborn Restaurant is an example where the Mexican onyx has been used, both for the balusters and in thin slabs of veneer for the walls.

#### STRAINS.—IX.\*

By G. A. T. MIDDLETON.

##### FRAMED CANTILEVERS.

THE strains in the different members of all framed structures can be ascertained by applying to them either the parallelogram or the polygon of forces, or both. The strains discovered are those of tension and compression only, and it is assumed that they act in straight lines, between the pins joining the different members together, and these lines alone are represented on the diagrams appended to this and some succeeding chapters.

The most simple form of framed structure is the framed cantilever, commonly known as the bracket or crane, according to the use to which it is put.

The strains upon the members of a simple

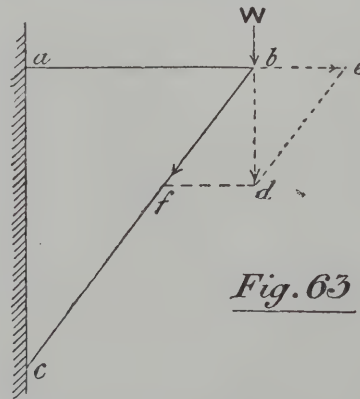


Fig. 63

bracket (Fig. 63) are readily ascertained by means of the parallelogram of forces. Assuming the bracket to be loaded only at the end, set

down vertically below the point of application of the load  $W$  a line  $b d$ , representing  $W$  to any scale of weights, the load acting downwards in the direction of the arrow. Round  $b d$  as a resultant form the parallelogram  $b e d f$ , with its sides parallel to the members  $a b$  and  $b c$  of the bracket; then  $b e$  will represent the strain in  $a b$ , and  $b f$  the strain in  $b c$ , to the same scale as that to which  $b d$  was set down. The direction of the strains is shown by the arrows,  $a b$  being in tension on account of the pull of  $b e$  from the wall, and  $b f$  in compression, on account of the push of  $b f$  towards the wall.

The same result can be arrived at arithmetically with the help of Euclid I. 47, if the lengths of  $a b$ ,  $b c$ , and  $c a$  be known ( $a b c$  and  $b e d$  being similar triangles), or by means of trigonometry, if either of the angles  $a b c$  or  $b c a$  be known. Given neat draughtsmanship, however, the graphic method of determining stresses is as accurate as either of the others, and its rapidity gives it a great advantage in practical use. This advantage also can be greatly increased, especially in complicated structures, by the employment of reciprocal diagrams. The application of one of these to the simple case now under consideration is shown in Fig. 64, in which, for simplification, Bow's notation of the spaces is employed. The reaction of the support is known to be equal to  $W$ , because the whole weight is borne by the support, and it acts upwards at the foot of the bracket. The space lying between  $R$  and  $W$  over the bracket is lettered  $a$ , that from  $W$  to  $R$  under the bracket,  $b$ . Then the space inclosed by the bracket must be lettered  $c$ . Great pains must be taken to grasp the fact that

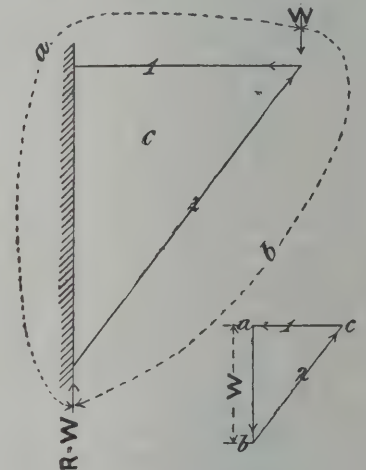


Fig. 64.

spaces are now being lettered on the sketch, and that these spaces correspond with similarly lettered points on the reciprocal diagram in the following manner. Between the spaces  $a$  and  $b$  there lies the weight  $W$  acting vertically downwards. From the point  $a$  to the point  $b$  set to any scale of weights a distance vertically downwards equal to  $W$ . Then between the spaces  $b$  and  $a$  there lies the reaction  $R$  acting vertically upwards, this being represented on the diagram by the line  $b a$ , vertically upwards. A closed polygon,  $a b, b a$ , is thus formed in the one line between the points  $a$  and  $b$ , representing the external forces acting on the bracket, showing that these forces are in equilibrium.

In order to complete the diagram, and ascertain the position of the point to represent the space  $c$ , as well as the strains in the two members of the bracket, it is necessary to consider the forces acting at one of the joints. For the sake of convenience it is best to choose the joint at the apex of the bracket. Here, between the spaces  $a$  and  $b$ , there lies the load  $W$ , already represented by the line  $a b$ . Between the spaces  $a$  and  $c$  there lies the horizontal member of the bracket; from the point  $a$  in the diagram, therefore, draw  $a c$  horizontally and of unlimited length. Between the spaces  $b$  and  $c$  there lies the inclined member of the bracket; from the point  $b$  in the diagram draw  $b c$  parallel to this member till it cuts  $a c$  in  $c$ . Then, to the scale to which  $W$  was set down in the diagram,  $a c$  represents the strain in the member lying between the spaces  $a$  and  $c$ , and  $b c$  represents the strain in the member lying



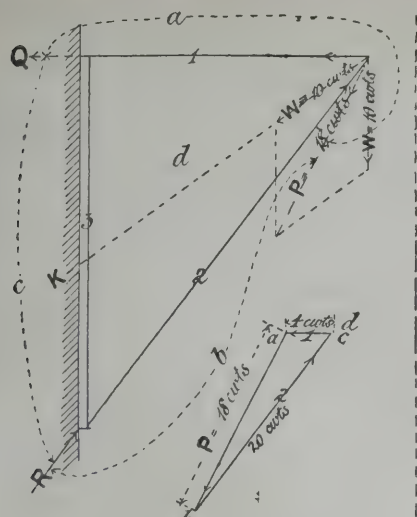


Fig. 65.

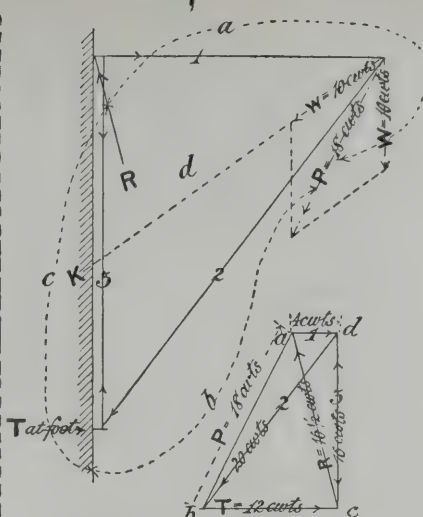


Fig. 66.

between the spaces *b* and *c*, the letters used reciprocating, and the triangle *abc* in the diagram forming the triangle of forces about the apex of the bracket.

The strain in *d* is again divided at its foot into *R*, acting vertically upwards, and a thrust, equal to the strain upon the line 1, acting horizontally. This last has not been shown on the diagram for the sake of clearness.

Not only the value, but the nature also, of these stresses can be shown on the sketch. It is one of the properties of a triangle or polygon of forces of any number of sides, that if it be properly closed and represent in order the forces acting upon a point (such forces being in equilibrium), the direction of these forces will follow in consecutive order. Of the forces at the apex of the bracket, *W* is known to act vertically downwards from *a* to *b*. The other forces will therefore act, as shown by the arrows on the reciprocal diagram, from *b* to *c* and from *c* to *a*. If these arrows be transferred from the diagram to the sketch, it will be seen that that on the inclined member pushes towards the joint under consideration, while that on the horizontal member pulls away from the joint—in other words, the latent force in the member between *b* and *c*, which meets the strain upon that member, pushes towards the joint, the member being in compression, while the member between *a* and *c* is in tension.

The above lengthy explanation of a simple principle should be most carefully studied and mastered, as upon it depends the unravelling of many a complicated problem.

The stresses upon joints are of as great importance as are those upon the members of a structure, for the strength of the whole is only that of its weakest part. If, as is usual, the weight upon the bracket be carried at the apex as shown, but resting upon the extremity of the horizontal member, to which the inclined member is pinned, the shear on the pin (which generally exposes two shearing areas, each meeting half the shearing stress) is equal to the resultant of the load *W*, and the tensional strain in the horizontal member—or, in other words, is equal to the compressional strain in the inclined member.

Should the bracket carry a distributed load, half of this may be considered to be borne by the wall direct, and the remaining half to act as an end load, in which case the strains due to this must be ascertained in the same manner as those in the last example, substituting  $\frac{W}{2}$  for *W*. In addition to the tensional stress thus found to exist in the horizontal member, however, it must be remembered that it acts as an ordinary beam carrying a distributed load between two supports (viz., the wall and the apex of the bracket), and that it must be proportioned accordingly.

When the cantilever is used as a crane—viz., when a rope or chain passes over a pulley at the apex of the bracket to support a weight—it is not this weight only which goes to form the stresses in the members. The rope passing over the pulley pulls on it in two directions

(see Figs. 65 and 66), the resultant *P* being the pressure bearing upon the pulley and causing the strains. It is this resultant, or the thrust in the member 2, whichever may be the greater, which has to be borne as a shear upon the pin at the apex joint.

The cranes shown in Figs. 65 and 66 are in the form of simple brackets, resting upon eyes let into the wall, so that they may rotate freely to any required position. The chain (which is presumed to carry a weight of 10cwt.) passes over the pulley and down to a winch at the point *K*. The weight and the winch each pull upon the chain to the extent of 10cwt., causing a resultant pressure upon the pulley *P*, which is equal to 18cwt. in amount, and the direction of which is shown in the diagrams. In such a crane two cases are possible: it may be supported either by hanging on to the eye at its head, or by resting on the stirrup at its heel. In the latter case the diagram is a simple one, and is given in Fig. 65. We know at once that the external forces acting on the crane are the pressure *P*, the reaction *R* at the heel, equal in amount and direction to the strain on the member 2, and a direct resistance *Q* at the head, equal to the strain on the member 1. Common sense, a useful factor in the investigation of strains as in many other matters, tells us that there is no strain in the member 3; and that the strain in 2 is conveyed in its full original force and direction to the wall by the eye at the foot acting as a very short cantilever—this eye being subject to a vertical end load and a horizontal thrust, respectively the vertical and horizontal components of the strain in 2, into which these are again resolved on reaching the wall.

The space between *Q* and *P* on the sketch should be lettered *a*, that between *P* and *R* letter *b*, and that between *R* and *Q* letter *c*. The space in the centre of the bracket may be lettered *d*.

Between the spaces *a* and *b* there lies the pressure *P* of 18cwt. Lay down, therefore, on the diagram from the point *a* to the point *b* a distance equal to 18cwt., to a scale of weights to represent *P*, and parallel to its direction. The other external force being as yet unknown, it is impossible to lay it down; but the strains in the members 1 and 2 can be ascertained by drawing *ad* and *bd* (1 and 2) on the diagram respectively parallel to the members 1 and 2 lying between the spaces *a* and *d*, and *b* and *d*. The strain on 1 is therefore represented by the line 1 on the diagram, which equals 4cwt.; and the strain on 2 is similarly shown by the line 2, and is equal to 20cwt. The direction of these strains is shown by the arrows, for *P* acting downwards the arrow was set downwards from *a* to *b* on the diagram, and the other arrows on the diagram follow in rotation round the closed polygon from *b* to *d* and from *d* to *a*. These being transferred to the sketch show the arrow on 2 to point towards the joint under consideration, the member 2 being, therefore, in compression, while the arrow on 1 points from that joint, showing that 1 is in tension.

There being no strain in the member 3, it is evident that the spaces *d* and *c*, between which it lies, may be represented by one and the same point (lettered *d* and *c*) on the diagram. *R*, therefore, lying between *b* and *c*, is equal in amount and direction to *b* on the diagram, the polygon of forces acting at the foot of the bracket being represented by the lines *db*, *bc*, *cd*, which last is *nil*; and *R* may be divided up into vertical and horizontal resistances if required, as explained in the previous case. Similarly the polygon *ca*, *ad*, *dc* represents the polygon of forces about the head of the bracket, *ca* being opposite and equal to *ad*, and representing *Q*, the resistance of the wall at the head of the bracket.

The case shown in Fig. 66, where the crane hangs at its head, requires somewhat further consideration. The external forces here, besides *P*, are a horizontal thrust, *T*, at the foot, and the reaction, *R*, at the head, of which neither the value nor direction is known, save that it is equal and opposite to the resultant of the strains in the members 1 and 3.

The lettering may be similar to that of Fig. 65, the space between *R* and *P* being lettered *a*, that between *P* and *T* being lettered *b*, and that between *T* and *R* being known as *c*, the space in the centre of the bracket being *d*.

From *a* to *b* on the diagram a distance may be set down as before, equal in amount and parallel in direction to *P*, and the triangle *abd* may be completed, representing the pressure *P*, and the strains in 1 and 2. So far this is exactly similar to the previous diagram, the strains, both in amount and direction, in the members 1 and 2 being the same as those then ascertained. For the sake of clearness the arrows relating to this triangle are not again shown.

Both at the head and foot of the bracket, however, there are two, as yet, unknown forces. At the foot the directions of both (the thrust *T*, and the strain in 3) are known, which is not the case at the head where the direction as well of the value *R* remain unknown. By drawing *bc* on the diagram parallel to *T*, which lies between *b* and *c*, and by drawing *dc* parallel to 3, which lies between *d* and *c*, it is possible to fix the point *c* on the diagram to represent space *c* on the sketch. The value of *T* is thus ascertained, by scaling *bc*, to be equal to 12cwt., while the value of 3 is similarly found, by scaling *cd* on the diagram, to be 16cwt., all the forces at the foot being represented by the triangle *bcd*.

The member 2 is known (from the consideration of the previous case) to be in compression, and therefore thrusts towards the joint under consideration, the arrow pointing downwards. This arrow is transferred to the diagram, pointing from *d* to *b*, the other arrows following round the triangle *dbc* in rotation from *b* to *c* and *c* to *d*. These being transferred back to the sketch, show *T* thrusting towards the joint, and 3 in tension pulling away from it.

At the head of the bracket there is, now that the value of 3 has been ascertained, but one unknown force, *R*; and this can be found, as it lies between the spaces *a* and *c*, by joining *ac* on the diagram. Its direction is parallel to *ac*, and its value 16½cwt.

The forces acting at the head of the bracket are now represented by the sides of the triangle *adc*. The member 3, lying between *d* and *c*, has just previously been found to be in tension, and therefore pulls away from the joint. This arrow, therefore, points downward from *d* to *c* on the diagram (i.e., in the opposite direction to the arrow which denoted that the member 3 pulled away from the previously considered joint at the heel), and the other arrows following in rotation from *c* to *a* and *a* to *d*, show, when transferred to the sketch, that *R* acts upwards, and that 1 pulls away from the joint and is in tension.

#### THE ROYAL SOCIETY OF BRITISH ARTISTS.

THE galleries of this old Society have this year lost much of their interest. We miss the Whistlerian influence and the work of disciples of the late President, who imparted a fresh tone to the Society and took it out of old grooves, and we see in its place some careful, but little brilliant, work. In the large gallery we notice very few strong pictures. One of the first landscapes we notice, (228) it is true, has



qualities that, if not naturalistic, still find admirers among the older school. For subdued tone, honest handling, and healthy colour, we must award praise to Edwin Hayes's "View of Dordrecht" (234), and to L. C. Henley's "Castles in the Air" (230). Ernest Parton (235) is still loyal to the doctrine that light and colour are inseparable, and has long since achieved the traditional teaching. A small study of a head, by Sir Frederic Leighton, P.R.A., hangs like a pendant in a noteworthy position, below it being a fine blue seascape in Henry Moore's best style. True sentiment and colour are to be found in Arthur Burrington's "Behind the Window Pane" (243). Hilda Montalba's small study of a windmill (250), G. S. Walters's "Old Veterans" (257)—a bit of Portsmouth Dockyard—are subjects that appeal to popular sympathies. A pretty piece of sentimental portraiture is a little girl's head crowned by a wreath of red poppies, by Mary Barkham Miller (261). Godfrey Merry sends a reminiscence of the Italian Exhibition (263). W. Frank Calderon is happy in his treatment of the toiling farm-horses with their leader going home; the sentiment is natural, and the drawing and colour strong. Yeend King, in the "Rod Shed" (267), is a pleasant study of an osier stream, painted with masterly skill, and James Peel's "Liedr Valley" loses nothing of its charm by repetition. One of the strongest subjects of the pathetic *genre* class is E. M. Bakewell's "The Daily Round, the Common Task" (269)—a cottage interior, an aged woman and her daughter before a large old-fashioned fireplace preparing the vegetables for dinner—painted with much power and true feeling. Below hangs a very charmingly conceived and delicate study, entitled "A Votive Offering," by Bessie Guilloid (273)—a group of flowers in a vase against a wall, on which hangs a monochrome portrait of the Virgin. The simplicity of the composition, no less than its delicate colouring and handling, deserves praise. Clever finish and spirited workmanship characterise some small studies. Louis B. Hurt's "Late Autumn" (286), Chas. Eyles "A Sunny Morning," in its cool grey colour; and Haynes King's "Badinage," a clever figure study, are works of merit. The president, Wyke Bayliss, contributes here a large interior of Amiens Cathedral—evening effect exquisite in the half-shadows and glimmering light and mingled colouring, of which he is so facile an artist. Beyond the procession of priests and acolytes is the long perspective of the nave, thrown out by the glories of shrine and sculptured detail in the choir. Two other works by the president are hung, one a view of the Sacristy, Ronen (498), a fine specimen of architectural effect and blended light and colour. "A Kent Pastoral," by Horace H. Cauty (278) has much of the true sentiment, and the small study of still life, "Rivals," by E. G. H. Lucas, a clever handling of the outward symbols of alcoholic liquor and temperance beverages. Jas. Hayllar's "Idle Hands" (314) is a pretty suggestion of autumn, and in the corner of room W. A. Breakspere sends a gracefully-painted dramatic personation of Rappaccini's daughter in scarlet (320). Landscape, in its real and ideal aspects, is painted by A. de Breanski (310), V. P. Yglesias, Yeend King (323), J. S. Hill (390), and by Stuart Lloyd, in his quiet after-glow effect, "Bosham, Sussex" (383), while coast scenery, as usual, finds its most vigorous exponent in Edwin Ellis, whose "Voice from the Cliffs" (330) and the larger picture "Summer Morning, N. Wales" (373), are fresh and naturalistic in colour, light, and shadow. G. F. Watts, R.A., contributes a clever study, "Ganymede" (337), and Sir John Gilbert's landscape (268) may be taken as a good example of the classical landscape style which Sir John has made his own in the grouping of the figures and bold handling. L. C. Henley sends several pictures. His most important work this year is "The Library in the Monastery" (368), a work evincing merit in composition and refinement. The two monks reading—one standing, the other seated—are well drawn, but the room and its furniture show a strange mixture of periods. H. G. Glindoni sends a humorous study (341), Margaret Ludovici some delicately-painted chrysanthemums, and Yeend King a nice piece of colour (353). The large subject, "Confiscation," by H. G. Glindoni (380), an episode during the

Rebellion, where the Parliamentary soldiers are engaged in the courtyard of an old hall ransacking the chests and overhauling the title-deeds of a young Cavalier who is being bound by cords, lacks somewhat sustained interest. A. W. Street's large picture (387) is commonplace, and we can only further take note of Geo. E. Hicks' "Day Dreams," which, in spite of some bad drawing, is poetic in sentiment and handling. In the other rooms we note a few works by O. Rickatson (16); Alfred Denyer, E. T. Wood (19), F. H. Walker (34); an idealised work, "La Baigneuse," by A. Ludovici, Nellie Hadden (53), Harry F. V. Weyde, A. Hartland (104), F. B. Barraud (view of the "Church of St. Walburg, Oudenarde") (122), F. E. Grone. In the south-east room Solomon J. Solomon's idealised head "Summer" in a low key of colour is exceedingly graceful and delicate. R. W. A. Rouse shows true feeling and colour in 444. The works of Edith Brinton (449), Arthur Dodd, J. S. Noble (436), James Peel (475), R. Hillingford (484), a group of Cromwellian soldiers tethering horses in Lincoln Cathedral; J. Clayton Adams, Stuart Lloyd (521), V. P. Yglesias (528), and the clever portraits by Hubert Vos, one of a Chelsea Pensioner (429), and the other, under twilight effect, are noticeable among several works of mediocre quality.

#### THE SOCIETY OF ARCHITECTS.

THE first ordinary meeting for the present session of the Society of Architects was held on Tuesday evening at St. James's Hall, Piccadilly, the President, Mr. W. H. Seth Smith, in the chair.

The first part of the meeting was made special for the confirmation of Rule 11, as revised on the motion of the President, seconded by Mr. Walter Emden. The rule was confirmed, and stands as follows:—

Any member, honorary member, or associate, acting in a manner which the Council may consider contrary to the dignity of his position as such, shall at their discretion, after his attention has been called to such act, and failing to give a satisfactory explanation, be removed from the roll of honorary members, members, or associates respectively; but shall be entitled to appeal to the members in general meeting by giving notice in writing to the secretary within one month of the date of the notification of his removal from the roll, in which case his removal shall be delayed until the decision of such general meeting be arrived at.

Three nominations for membership having been read, the following four gentlemen were elected by ballot as members: Charles Clarence Cook, 169, Frattin-street, Portsmouth; Charles James Coulson, Ramsey, Isle of Man; John Francis Groves, 3, Morden-road, Maindee, Newport, Mon.; and James William Nash, 7, Medway-terrace, Rochester. The report of the council and balance-sheet for the past session (summarised in our issue of Nov. 2, p. 590) were adopted.

The President moved that a letter of condolence be sent to the widow of Col. Duncan, C.B., M.P. To Col. Duncan's unceasing and indefatigable efforts in support of the Architects' Registration Bill he felt that the society owed much, and by his death they had sustained a severe loss. The motion was seconded by Mr. H. Roumieu Gough, the chairman of the Registration Bill Committee, and agreed to.

#### A COUNTRY MEMBER'S SUGGESTIONS FOR IMPROVING THE SOCIETY.

Mr. Frank Baldwin, of Cardiff, contributed a paper, read by the secretary, containing suggestions whereby the provincial members might be brought into closer contact with their fellow members, and other proposals for the improvement of the society. In the first place the author suggested that it would be well if reports of the provincial gatherings, with a few illustrations of the places visited, were included in the published Proceedings, so that those unable to be present might gain something from the meetings held, while those who attended would have a memento of what had occurred. He further suggested that a similar committee to that established for literary purposes should be formed as a Reference Committee, to which urgent queries upon points relating to the work or responsibilities of an architect could at any time be addressed, and from which answers could be received by the querist within a few days, or even within a few hours. No doubt this would entail an additional amount of labour upon some of the older

and more experienced; but it would, he thought, be of large benefit to the younger men. There was one other detail in the management of the society which had been considered a grievance by some of the country members. Unless in London at the time of a meeting, they had no means of voting for or against candidates proposed for membership. He would propose to issue the ballot papers for members with each notice of a meeting, members voting for a member to put a cross to his name; those voting against to erase the name, one erasure in three to exclude. The next suggestion, that of forming an architects' club, is, he said, no new one. A house of call of some sort is a matter of urgent need to country practitioners when visiting London. Would it not be possible to make arrangements for this purpose at the offices of the society in St. James's Hall, Piccadilly, by opening the meeting room to the members at all times, providing in it comfortable chairs and tables, with the professional and daily papers, and writing materials, together with a library formed by special subscriptions for that purpose amongst the members? Sleeping accommodation might eventually be provided, together with a separate set of rooms in which members could meet and consult with their clients or contractors or conduct arbitrations. Surely something of this kind is not beyond the means of the society, while it would be a great incentive both to London men and to provincial outsiders to join our number. Almost from the formation of this society the question has arisen now and again as to the establishment of branches in various provincial towns. If this could be managed a great impetus would be given to our proceedings, a considerable accession of members would follow, and a close bond of connection would be established amongst us. For country members it would simply be the difference between live membership and dead. There would be an opportunity for them to meet one another, not merely once a year at a provincial gathering or at rarer intervals when present at a London meeting, but sufficiently often for them to learn to know one another, to esteem one another, and consequently to rely upon one another. There would be an opportunity also for the local men in any particular district to unite to resist any local injustice, to overcome local prejudice, and to obtain that respect and consideration to which they as artists and professional men are justly entitled. There are one or two towns now which possess almost a sufficient number of members to enable a branch to be established: might it not be assumed that if a bold step were taken, and a branch thus locally and sufficiently indicated formed, it would prove a success? The towns, however, in which branches could be formed at present are few, and it is therefore proposed that the whole country be divided into districts, each having a head-quarters for meetings, with a separate managing committee and honorary secretary. At the commencement each district should contain at least 20 members. An organisation upon this basis, once established, would provide efficient machinery for ascertaining the opinions of architects throughout the country upon important matters with a minimum of labour and cost, and a maximum of effect. Even if in some few districts there be only two or three members at present and therefore no possibility of working it as a branch, at least the district would be there ready for further development when the opportunity arrived; or might not two or more neighbouring districts, possessed of only a small number of members, combine to form one branch amongst them? The relation of branches to each other, and to the central body, would be a matter for careful consideration. Each member should be entitled to all existing and prospective benefits as belonging to the central body in addition to such as might be granted by his branch, yet he should not be called upon for any further subscription than that demanded at present. Possibly it might be wise to raise subscriptions throughout the society were this suggestion carried into effect; but any additional subscription towards the formation of a branch would militate largely against its chance of success. The second portion of the subject, the raising of the standard of the Society, is connected with the first. A good many of the suggestions already put forward



would, if carried out, tend in this direction. They would, however, require for their full development to be augmented by an additional inner organisation. An understanding must be gradually introduced and solidified to the effect that useless members will not be tolerated; such as those who invariably decline to render any service either to the Society or to fellow members, by way of reading papers, obtaining information when desired to do so, attending and taking part in a meeting, or in any other way forwarding the work of the general body, or assisting individual members (as such, not merely as private friends), whenever a reasonable opportunity offers. This would not only relieve the Society of a considerable amount of dead weight, but would remind members that there are duties attaching to their membership. An undertaking to advance the welfare, progress, and usefulness of the Society in every way, should be signed by all candidates on their admission. In addition to this, we must not only maintain a keen look-out against unprofessional behaviour, but also against ignorance or incompetency in technical matters. This can only be done by instituting such a practical and searching examination as would properly test a man's ability and his knowledge of all essential matters connected with his profession. This examination should first be entirely voluntary, and it should be of such a character as to make it plain to the majority of members that they could pass it after a reasonable amount of study and preparation, but at the same time sufficiently severe to test the capabilities of a candidate. A further examination for honours might be instituted, including advanced subjects and those which do not rank as absolute necessities. The examination fee should be moderate, and to all who pass in the first examination a diploma should be granted, the possession of which could entitle a member to add to the usual "M.S.A." the further letter "D." Thus any name followed by the letters "M.S.A.D." or "D.M.S.A." would signify that the owner was a member of the Society of Architects holding a diploma testifying to his professional ability. To all who passed in the honours examination a superior diploma should be granted and some further means taken to designate the owners of it. To this class such members might be elected as to whose exceptional ability there could be no doubt, without requiring them to undergo any examination, thereby showing a public recognition of merit and also forming the nucleus of this higher class of members. We should then have in the society three separate grades or ranks of members—viz., the ordinary uncertified "M.S.A.," the certified members, and those who had obtained honours. The addition of another initial letter appended to the usual "M.S.A." would induce members to study to increase and solidify their knowledge so as to enable them to enter for the examination. At last, when all but a mere handful had gained the diploma either by examination or acclamation, the examination would be made permanent and compulsory upon all candidates for membership, save in rare cases where the ability of a candidate was beyond question. The Council should be untiring in urging members to gain the diploma, and quick in bestowing it when merited, so that the state of things in which the uncertified members would be in a minority should be as soon as possible brought about. The examination should deal mainly with modern construction, materials, and arrangement, all archaeological and legal subjects being taken up only in the honours examination. It may be urged that in view of the proposed or an amended Registration Bill, it is not necessary that any examination should be instituted for members of the society, as the Bill provides that all architects shall in future pass a test examination before being allowed to practise; but even if the Bill were to become law during the next session, this does not do away with the desirability of an examination for the members of the society. The examination would probably, however, come into vogue before the passing of the Bill. The last suggestion was that the minimum age for candidates for membership should be raised from 21 to 25 years of age.

Mr. A. STONER, in proposing a vote of thanks to Mr. Baldwin, said he thought the suggestion

that a Reference Committee be established to consider and give advice upon special difficulties experienced by members a valuable one. He agreed with the proposition to allow members to vote by post as to the admission of new members. On the other hand, he regarded the proposal to establish provincial branches of the Society as somewhat premature. It might be well to form a new class for the architects joining who were between 21 and 25 years of age, after which time they could be transferred to the ordinary membership.

Mr. F. W. FRYER seconded the vote of thanks, and Mr. S. C. JOHNS, in supporting it, remarked that while he agreed with many of the suggestions, he could see grave objections to the proposed vote by ballot on new members.

Other members strongly supported the use of the meeting hall as an arbitration room, and the proposed formation of a Committee of Reference and Advice. Mr. Ellis Marsland foresaw great difficulties in the way of establishing country branches, and believed it would be inexpedient except where the Society had already a large membership in the locality. The time had indeed come for that step to be taken. As to the proposal to add a big D before or after the initials "M.S.A.," he thought it quite absurd. Those who had passed an examination would not need such a distinguishing mark, and certainly would not use it. The proposal to form another class for junior members was more worthy of consideration.

Mr. ALFRED HOWARD held that men already in practice would not submit to an examination. The proposal to certify that a man who had passed an examination was qualified to carry out work was ill-advised, as it was impossible to estimate a man's practical abilities and business-like character until he was put to the test of actual work. He disapproved of the proposal to vote by post on candidates, as in a small town practitioners often felt an unconscious bias against a brother architect, and might be tempted to keep him out of any body he wished to join, lest it should give a rival additional status.

Mr. EDGAR FARMAN strongly approved of the formation of branches in the provinces, and thought the preliminary step might be taken forthwith of appointing a local honorary correspondent in each locality where the society had a footing. Similar officers had worked hard, and had done valuable work in aid of the Architects' Registration Committee, and he would make a distinct proposition to that effect.

This was seconded by Mr. A. PILBEAM; but Mr. WALTER EMDEN urged the desirability of postponing action till the next meeting, so as to allow time for reflection, and his proposal for adjournment was carried by a majority.

Mr. JOHN LEANING considered the proposed machinery for voting by post would be expensive, troublesome, and of little practical value. Judging from the experience of other professional clubs, he did not think that one restricted to architects would be a success, and as for the scheme for founding parochial branches, it was difficult to see how these would utilise the expenditure of energy, especially in small towns, where the chairman and secretary might be convened to hear and discuss a paper by the latter. The examination proposal again was wholly impracticable; examining bodies should be made in the interests of the profession as few as possible, and it would be far better to refer all candidates for examination to that established by the R.I.B.A. Voluntary examinations were of little value, but the advantage of a compulsory examination could hardly be overrated.

Mr. ROBERT WALKER, of Cork, vice-president, thought many of the suggestions in the paper would be of some value ten years hence, but at the present day they were premature. The Society had, however, been formed within the memory of everyone present, and it possessed all the qualities of youth—vigour, earnestness, self-reliance, and determination. Certain rules had been laid down on which they were working with considerable success, and he deprecated the suggested changes as too revolutionary. The proposal to form a club did not, he thought, judging from other movements of a similar kind, promise much success; and that of establishing branches did not come within practical purview. He concurred in the suggestion to make the minimum age 25 years, but

many of the other proposals he deprecated as savouring of sentiment rather than the practical advancement of the profession.

The PRESIDENT said he agreed with Mr. Walker that it would be a grave mistake to revise their rules afresh at present without serious cause. He concurred in the opinion generally expressed that many of the suggestions were premature; but some appeared worthy of consideration, and one, that of letting their meeting-room for arbitrations, had that evening been adopted by the Council. The proposal to form a committee of advice seemed a good one, but he believed if adopted they would find it necessary to appoint a paid officer to collect and transmit information. He felt that the examining bodies in architecture ought to be limited to one for each of the three kingdoms, or, better still, to a central authority. In conclusion, he announced that Mr. Walter Emden had offered £10 a year for three years to be given by the council as a prize for the best practical paper contributed during the session.

#### ROYAL SCOTTISH SOCIETY OF ARTS.

MR. WILLIAM BRUCE read a paper before this Society, at Edinburgh, on Monday night, on "Improvements in Traps, Disconnecting Chambers, and Drain Pipes," illustrated by drawings. After describing the form of fire-clay floors for disconnecting chambers as manufactured some years ago, Mr. Bruce next described the methods generally adopted in the construction of manhole floors, and stated various objections against the use of cement concrete for the floors, and common brick for the side walls of manholes.

The improvements made by Mr. Bruce in 1885 consist of drain traps specially designed for manholes, and some of the drains are made with a cap and access opening for inspection of tail drain, while others are made open in the outlet side of water seal, with access and cap to the inlet drain, and connection for the ventilation of inlet drains. The pipe formations or channels in the floor of manholes are made to correspond with the size of inlet and outlet pipes, and to any angle that may be required. The floor of small manholes with from two to four faucet connections for pipes and open channels, are made in one piece of strong glazed fireclay, and the formation of manhole between floor and surface is constructed with the same class of material, specially designed and prepared to make manholes watertight. Mr. Bruce asserted that all manholes in connection with a good system of house drainage should be watertight to near the surface level, so as to prevent the escape of liquid sewage during any temporary stoppage in the drains, and he maintained that all drains and manholes should be tested with water, and not rely on the smoke test, owing to the want of insufficient pressure in the application of this test.

Some of the illustrations showed a method of placing all the traps in one manhole, with separate ventilation for each inlet drain, and the drain from each soil-pipe laid direct to the trap in disconnecting chamber; with such an arrangement all the traps, inlet, and outlet drains can be examined from one disconnecting chamber.

The principle of connecting two or more soil-pipes to a drain, which is sometimes adopted, without separate disconnection for each soil-pipe, was described as a dangerous and bad principle which should always be avoided.

#### SECTIONS OF GIRDERS.

A VERY convenient pocket-book has been published by Messrs. Measures Bros. and Co., of Southwark-street, which, while serving as a calendar for the year, contains the sections of girders and joists which are kept in stock. These have been so ingeniously arranged that the weight per foot and the safe load for various spans are given within the section of each girder. Various sections from 6½ to 17in. deep are shown, in addition to the composite forms of greater depth, suitable for every kind of constructional want. The reputation these girders have obtained renders any particular description unnecessary here. Sections of riveted girders from 9 to 20in. in depth are shown, besides angle and channel-iron columns,



iron sashes, wrought-iron doors, cisterns, &c. The table of the estimated safe permanent distributed loads in tons will be found of special value to the architect, builder, and engineer. The new edition of Messrs. Measures Bros. and Co.'s little book combines in a handy pocket size just the data on iron construction that the architect is in need of.

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XXI.

By HENRY LOVEGROVE, F.S.I., Surveyor.

PLASTERER.				£ s. d.
Yds.	ft.	in.		
650	0	0	Supl.	Twice distemper walls an improved tint .....
564	0	0	"	Twice whitened ceilings .....
557	0	0	"	Render, float, and set walls .....
0	47	0	"	Counter lathing .....
74	0	0	"	Lath, plaster, float, and set partitions .....
564	0	0	"	Do. ceilings .....
0	376	0	Run.	Extra labour forming circular corner 14in. girt .....
				No. 70, stopped ends .....
				No. 26, do. on splay .....
0	460	0	Run.	Dubbing out with plain tiles in cement to form circular corner, 14in. girt .....
PORTLAND CEMENT FINISHED, KEENE'S.				
110	0	0	Supl.	Rendering on brick to form dado finished smooth for paint.
57	0	0	"	Do. but on lath .....
0	226	0	"	Rendering on brick, narrow, finished for paint .....
0	47	0	"	Do. on lath .....
0	37	0	"	Do. on brick circular .....
0	187	0	"	Cove on lath, including deal bracketing .....
0	112	0	Run.	Angle and arris .....
0	789	0	"	Labour slightly rounded angle .....
0	78	0	"	Do. do. circular to arches .....
				No. 158. Stops .....
				No. 12. Mitres .....
0	389	0	Run.	Extra to flush bead to form skirting .....
0	28	0	Run.	Do. circular .....
				No. 28. Stops .....
				No. 10. Extra to rounded angles in do. ....
0	84	0	Run.	Extra to circular corner 14in. girt .....
				No. 24. Stops .....
0	560	0	Run.	Extra to bold flush bead to form dado .....
0	28	9	Run.	Do. circular .....
				No. 42. Stops .....
				No. 10. Extra to rounded angles .....
0	70	0	Run.	Weathering 3in. wide to necking and dubbing .....
				No. 20. External mitres .....
				No. 4. Internal do. ....
				No. 2. Steps to cove 2ft. 3in. girt ..
				No. 2. Splayed do. ....
PLUMBER.				
Cwt.	gr.	lb.		
47	2	14	Milled lead and labour laying in flats, gutters, and cheeks to dormers, and allow for laps .....	
Yds.	ft.	in.	Run.	Extra labour dressing 6lb. over tiles and edge of flat .....
0	31	0	"	Open copper nailing .....
0	163	0	"	Close copper nailing .....
0	121	0	"	No. 4. Extra to drips .....
				No. 84. Soldered dots and screws .....
				The water supply to be carried out in accordance with the water company's regulations .....
				(It is supposed that the cistern and hot-water supply will be in a separate building) .....
				Provide one hundred feet of 3in. strong lead pipe, including digging trench and laying the earth returned and well rammed .....
0	10	0	Run.	3in. lead supply pipe .....
0	6	0	"	3in. do. ....
0	142	0	"	3in. do. provisional .....
0	14	0	"	3in. do. flushing pipe .....
0	10	0	"	2in. do. do. ....
				No. 2, soldered joints in 3in. pipe .....
				No. 6, do. in 3in. pipe .....
				No. 6, 3in. brass screw-down taps .....
				No. 2, plain white wash-out closet (list p.c. £3 16s.), and fixing with clean deal-hinged seat on brackets in addition .....
				No. 2, approved water-waste preventors, p.c. 25s., with galvanised iron chain and handle, and fixing on proper brackets, with overflow pipe complete .....
				No. 2, hospital baths of copper on wheels, with vulcanised india-rubber tires and washer, and plug for emptying .....
				No. 4, do. sinks 3ft. 6in. by 2ft., with brass grating, &c., and fixing on proper fir bearers .....
Carried to summary ...				
GLAZIER.				
0	436	0	Supl.	21oz. best flatted sheet-glass in small squares .....
0	23	0	Run.	Circular cutting and risk on 21oz. sheet-glass .....
0	60	0	Supl.	3in. small fluted plate-glass in small squares .....

Yds.	ft.	in.		
0	219	0	Supl.	Lead quarries and glazing with coloured glass, p.c. 2s. per foot supl., in iron frames
				Leave all glass clean and perfect at completion of works
Carried to summary				
PAINTER.				
12	0	0	Supl.	Paint four coats on iron
0	146	0	Run.	Do. on small pipes
0	125	0	"	Do. on bar
0	237	0	"	Do. on eaves gutter (in and out)
0	143	0	"	Do. rain-water pipe
				No. 4, Do. king-heads (see Smith's bill)
				No. 8, Do. shoes do.
				No. 5, Do. chimney-pieces and grates
				No. 24, Do. casements, 1ft. 11in. by 1ft. 11in.
				No. 24, Do. do., 1ft. 10in. by 3ft. 6in.
				No. 12, Do. do., 2ft. 6in. by 3ft. 2in.
				No. 24, Do. do., 2ft. 6in. by 3ft. 5in.
170	0	0	Supl.	Paint four coats on cement
0	422	0	Run.	Flush beads cut in both edges
351	0	0	Supl.	Stop, knot, prime, and paint three coats on woodwork
0	2414	0	Run.	Do. frame one side
0	90	0	"	Do. balusters
				No. 130, Do. ends rafters
				No. 8, Do. cleats for purlins
				No. 4. Stop knot and prime and paint three coats window frames one side
				No. 99, (Dozen) do. squares do.
				No. 141. Do. do. casements do.
141	0	0	Supl.	Twice varnish with best copal varnish
0	1273	0	Run.	Do. frame one side
0	90	0	"	Do. baluster
				No. 4. Do. cleats for purlins
				No. 4. Do. frames one side
				No. 53. (Dozen) do. squares do.
				No. 82. Do. casements do.
				No. 12. Do. do. iron casements 1ft. 11in. by 1ft. 11in. do.
				No. 12. Do. do. 1ft. 10in. by 2ft. 6in. do.
				No. 4. Do. do. 2ft. 6in. by 3ft. 2in. do.
				No. 12. Do. do. 2ft. 6in. by 3ft. 6in. do.
Carried to summary				

NOTES AND CORRECTIONS. — Trifling discrepancies in printing the figures I have passed over, but consider that the following should be noted:—Page 399 *ante*, the fifth and sixth items should have 3 before them; the 9th, 10th, 12th, 15th, 16th, and 17th should have 2, and the 11th 4, as shown by the squarings. The item before "Facings," in the same column, should read "3 B. in necking." Page 435, item 15 should be "5 times 4 mitres," and in the next column the total number of, "Flues P. and C. is 11." Page 436, first column, ninth item (from the bottom), read "5ft. 9in." for "4ft. 9in." In the next column, read "32ft." as the squaring of the first item. Page 491, first column, items 7 and 8 read "four oils" after "squares" and "casements," and three items lower read "notched and returned ends." In the same column, near the bottom, after "fir lintel" read "frame b. and p." and "deal fixing bricks" in the two lines instead of as printed. In the second column, under the heading "Circular Windows," the deductions should be marked as circular, which it is not easy to do in printing. Towards the end of the same section, read "Deduct R.F.S. and twice colour." Page 501, the squarings were omitted by accident, and the dimensions from the word "Trusses" down to and including "No. 4 York templates," should have a figure 2 in front of them. Page 534, first column, the result of "Dig, fill, and ram" should be "152ft. 10in." not "151ft. 10in." In the second column, under item "Frames b. and pt." there should be two 12's, not three, and under the heading "Patent Concrete," read "run," not "room." Page 535, first item, the figure 6 has been omitted before 4ft. 7in. Page 536, the second and fifth items should have 2 before them, and the sixth item should have 78 (see the squarings in all cases). Page 568, first column, read "rebated drips," not "rebated dips." Page 569, the correct squaring, &c., is "123ft. 9in. L.P.F.S. and twice colour partition." In the same, the first item from the bottom should have 4 before it, and the second and fourth should have 2. In the second column, the third item should read "19ft. 9in. by 5ft. 6in.," and under heading "Dado" read "6 times 3ft. 6in. = 21ft. Extra labour forming, &c." In the third column, first item, read "Bold flush bead," and eighth item read "6 times 1ft. 2in." Page 627, third column, read "3 terracotta chimney-pots, &c.," and under the heading "Window to cupboard" read "Twice 9in. = 1ft. 6in. fair cutting to skewback." Page 628, item 16 should have 2 before 3ft. 9in.

and under the heading "Internal Plumber" read "twice 5ft. = 10ft. ½ lead supply."

### A SUBURBAN STABLE.

The next subject for which we have prepared the quantities is a suburban stable, comprising four stalls and two loose-boxes, with a coach-house and harness-room. Above is a large loft, and separated from it by a brick wall is situated a groom's bedroom over the harness-room, with which it is connected by a ventilated staircase lobby. An apple store and root loft is placed over the coach-house to meet a special requirement of the gentleman for whom the building was designed. The coachman's house is placed at the other end of the stable facing the road, and accommodation is provided for an entry and good landing, a sitting-room, kitchen, and pantry, with a wash-up sink in it. A wash-house and scullery were purposely omitted as no laundry work is to be done on the premises. On the first floor are three bedrooms. The house is divided from the stable by a brick wall all the way up. The coal-place, dung-pit, and w.c. are screened off by a wall enclosure. The materials are red brick and stone dressings, with tile-hanging to the first floor. The front gable is in half-timber work with plaster filling. The pigeon-cote is covered with lead. All the principal parts will be fully detailed, and the system of drainage will be illustrated.

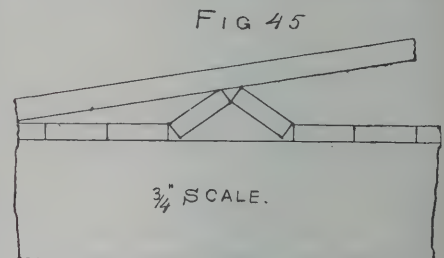
### CARPENTRY AND JOINERY.—VII.\*

#### FLOORING.

ALTHOUGH when the roof is on and slated, and all connected therewith rendered watertight, it would not be good policy to commence and lay down the floors; still, it is just as well to take this branch next in order, as many kinds of wooden floors are more the work of the carpenter than the joiner, and hitherto we have been taking up his share in the building.

The simplest kind of flooring is that with straight joints (square edges), and as nowadays the use of machinery enters so largely into the preparation of carpenters' and joiners' work, so in this department the flooring boards are planed both sides and both edges, the machine making them parallel in the process, thus rendering it much more easy to lay this kind of flooring than formerly.

Fig. 45 shows a method of laying this kind



of flooring; of course, first of all, the flooring is cut down upon the joists to cover them, care being taken that where doorways occur, and the floors on each side are on the same level, and the joists running in the same direction, that the boards continue through the doorway, not heading all the boards which make up the width of the doorway, at the open; and also making due provision for the hearthstone. This was referred to in the chapter on Joisting. Headings are made on the joists, and only one width of flooring board should be headed at any given place on a joist; as several heading joints together are unsightly, weaken the floor, and are not good workmanship, no matter how skilfully made. Referring again to Fig. 45, if this method be adopted, and sometimes flooring cramps are not at hand, start at the wall, laying a board close to it, and if it do not fit pretty closely, scribe it to it—that is, set a pair of compasses to the width at the part which is most open, and draw them along the wall, tracing a line on the flooring board with one leg of the compasses at the same time; this line will, of course, be parallel to the wall; work the edge to this line either with an axe or a saw, and nail it down.

\* All rights reserved.







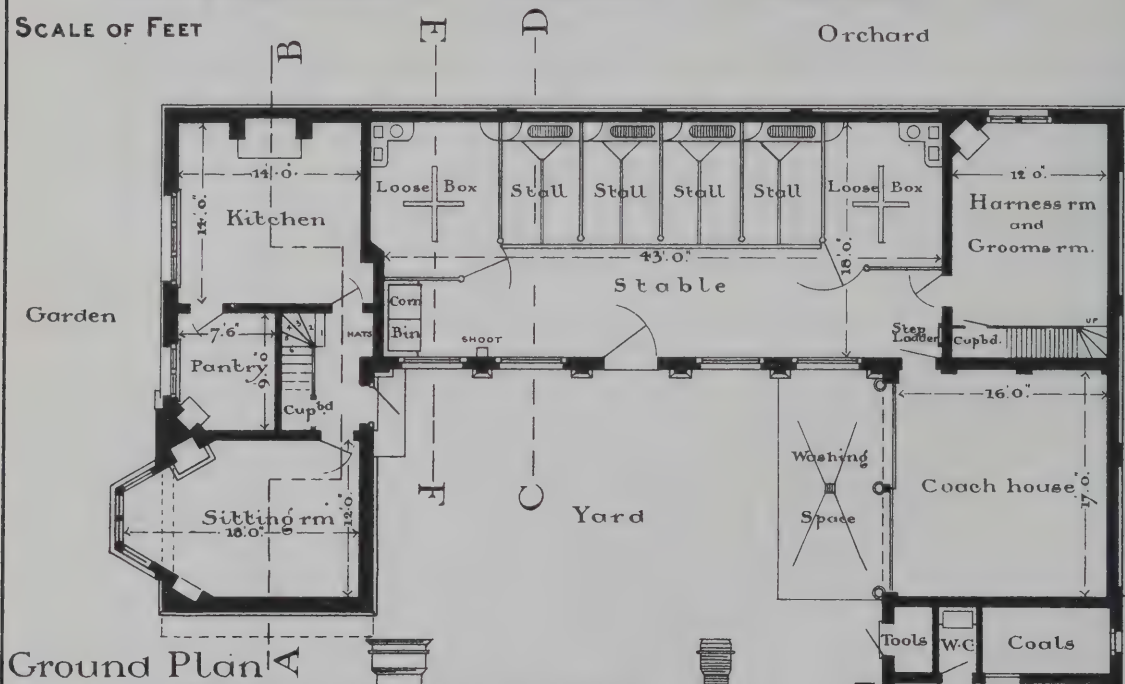


Stable Yard Front



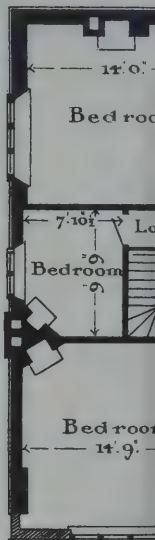
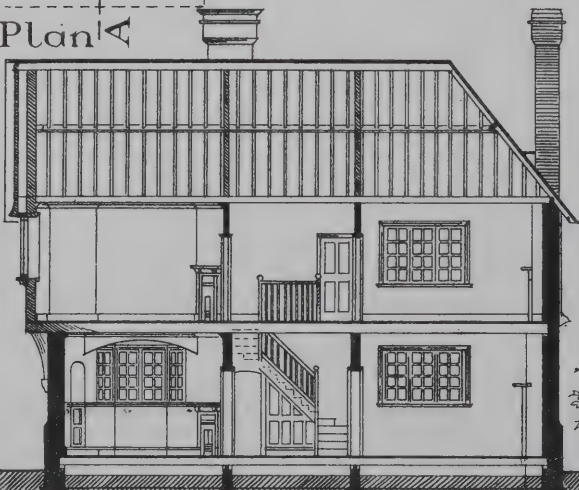
SCALE OF FEET

Orchard



Ground Plan A

Section A.B.





Dec. 30, 1888.

# STABLES AND COACHMAN'S HOUSE

NEAR RICHMOND ON THAMES

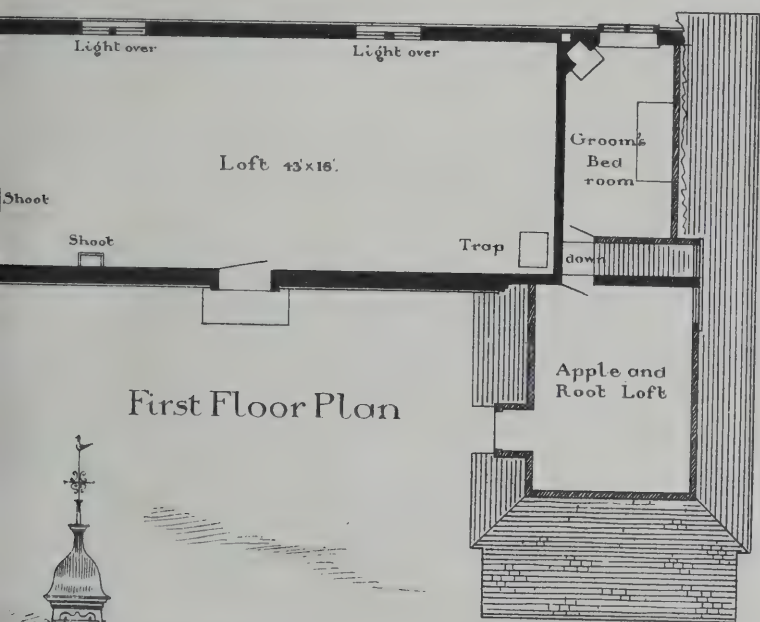
No. 8

MAURICE B. ADAMS F.R.I.B.A. ARCHITECT

Section E.F.



Road Front

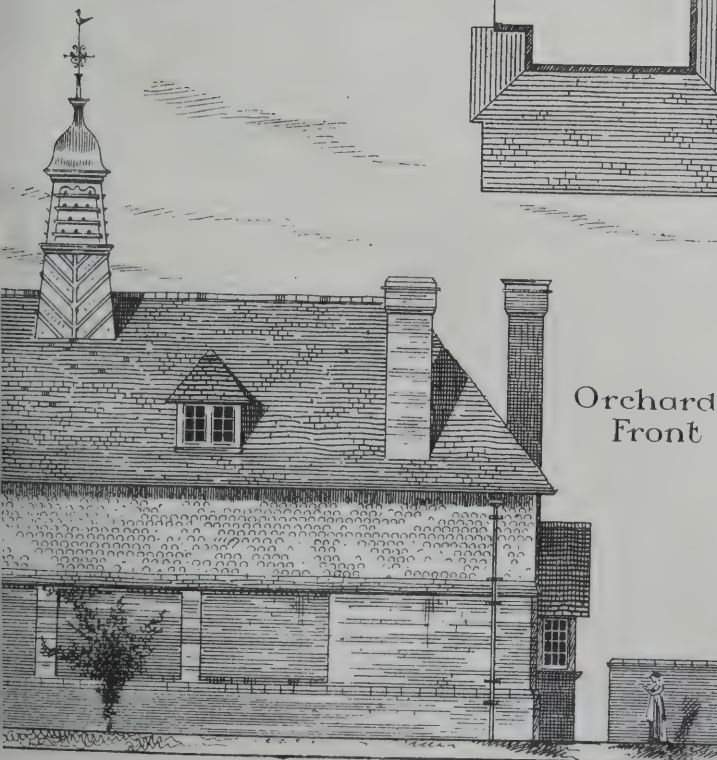


First Floor Plan

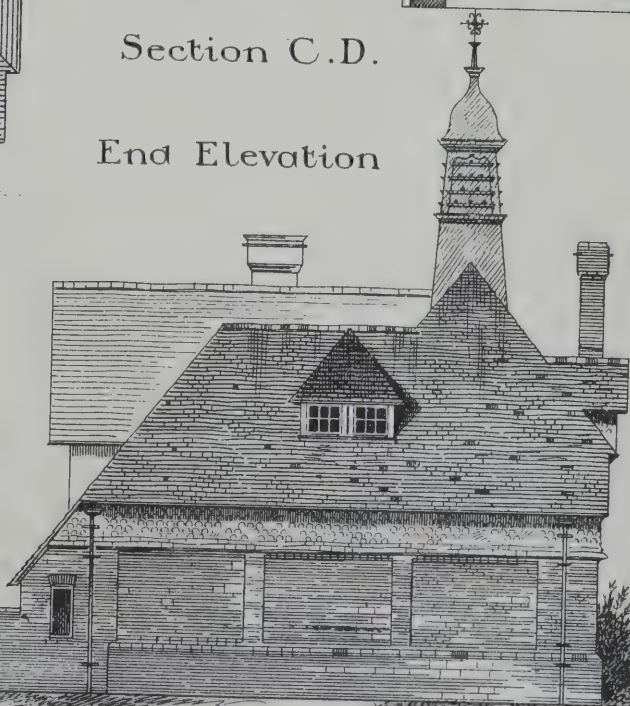


Section C.D.

End Elevation



Orchard Front



WITH DETAILED ESTIMATES



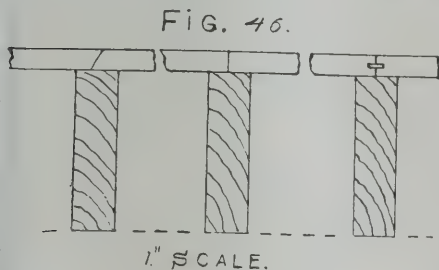




Now draw about half-a-dozen or so of boards close together and against the one just nailed down mark the place where they cover to on the edges of several of the joists—say at intervals of 4ft. apart—which marks are to serve as a guide to nail down the outer board. Before doing so, however, draw lines across the boards over the centre of each joist, to serve as a guide for driving in the flooring brads; now nail down the outer board, and in doing so keep it within the marks made on the joists, as many 1-16ths as there are joints; if six boards have been taken keep it 5-16in. inside of the marks, and so in proportion. When the outer board has been nailed down, set the two central ones up, as shown in the figure, and be sure the under edges come together in the centre, as shown; lay as many pieces across as there are persons to jump upon them, which should be done simultaneously, and thus it is forced into its right position. When this is done, put a row of brads across about every fourth joist; then out in all the rows, and proceed to lay a like number of boards until it is fully covered.

Sometimes little difficulties arise in putting in the last board or so. One way with it is: scribe it to the wall as was done with the starting one, lay it down, seeing how much it is broad by marking here and there along on the floor already laid, plane off the extra width except a sharp  $\frac{1}{4}$ in., which is allowed for tightening; now lay it in a sloping position, the edge next the wall being the highest, and drive it down with a heavy hammer, laying a piece on to receive the blows and prevent the flooring from being bruised.

Fig. 46 shows three ways of forming heading



oints—splayed, groove and tongue or fillet, and square butt. The splayed is more generally adopted than any other; for ordinary flooring a very inferior work only is the square butt used; both of these joints can be made with a fine saw, without any planing at all; it is just as well, however, to have a bevel line on, to serve as a guide in sawing, although with long practice it becomes unnecessary. The groove in the heading joint may be made with a plough plane or by a grooving plane, a little bit being taken out of the edge opposite to where the plane is entered, to prevent the plane knocking it out; it can also be taken out with a chisel the exact size, having previously run on gauge lines to work to.

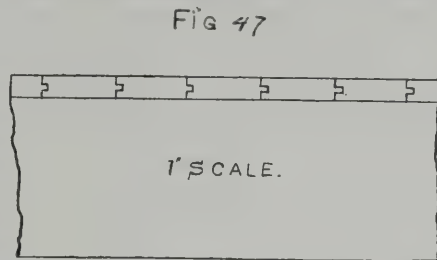
When flooring cramps are to be had, the process will differ slightly from that above stated.

Flooring cramps are of different kinds, and are so commonly used as to be familiar to nearly, if not all, connected with the building trades. To proceed, and explain the difference when cramps are used: scribe and nail the board next the wall as before, now draw close about 4ft. wide of boards, draw the lines across over each joist, be sure that the heading joints are loose, then outside of the boards lay a piece of 4in. by 1 $\frac{1}{2}$ in. or 4in. by 2in. for a ledger to distribute the pressure and prevent the cramps from injuring the edge of the flooring. Put the cramps on the joists (there should be one every 4ft. or 5ft.), tighten the ledger against the flooring by screwing up the cramps, continuing the screwing until all the joints are thoroughly close, when it may be nailed down, beginning to nail nearest the cramps, and nailing towards the wall board; by this means the pressure is taken off the cramps.

Flooring brads should be generally three times the thickness of the flooring in length. When all is nailed down the nails should be punched in a little lower than the surface, and is sometimes usual to fill in the space made by punching with putty. The surface joints may be planed off level; but in better class

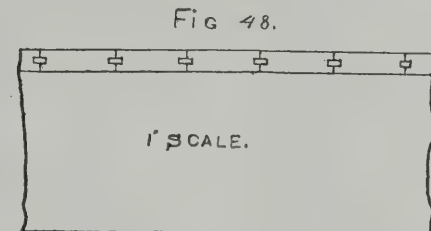
work the floors are planed off smooth after the plastering has been done. Floors in being cleaned off are sometimes traversed, which is planing across the flooring at an angle, and ever testing it with a straightedge to see that it is true to it in all directions.

Fig. 47 shows another form of joint which is sometimes adopted for floors, being tongued



and grooved edges. This kind is very suitable for hardwood floors, such as pitch-pine, oak, &c., where no nailing is to be seen; the method of nailing is shown. Of course, it has to be put down one board at a time, and as is seen, only one edge of it is nailed, and that with hand-made brads (hooks), say 2 $\frac{1}{2}$ in. long for 1 $\frac{1}{2}$ in. flooring.

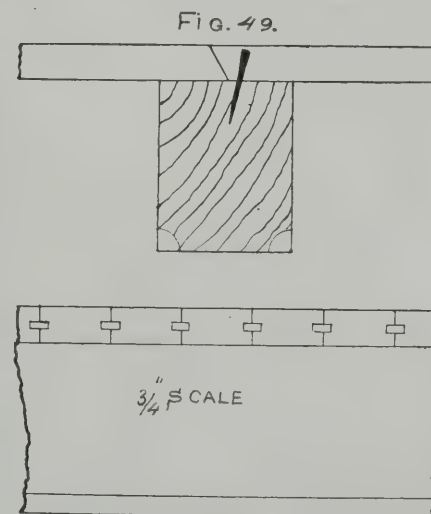
Fig. 48 shows another description of joining the edges, being that both edges of each board are grooved and a tongue or fillet is inserted. If it is not necessary to conceal the nailing, 3ft. wide may be cramped together at one time: but, of course, the boards must be placed in position singly and the fillets put in, lines being drawn across and nailed after being



cramped up as before described. Sometimes the fillets inserted in the grooves are of hardwood, and even at times of hoop-iron.

The ground floor of warehouses and stores are sometimes laid with flooring jointed either like that shown in Fig. 47 or Fig. 48, but 3in. thick; and, of course, the groove and tongue or grooves and fillets are larger to correspond. If iron hoop is used, it is also stronger in proportion.

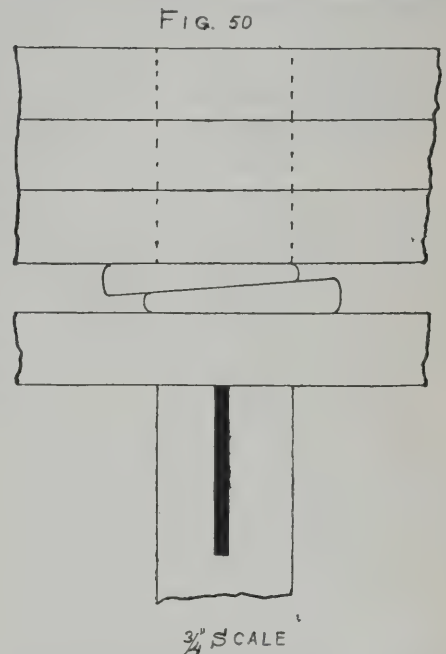
Fig. 49 gives two sections of batten flooring



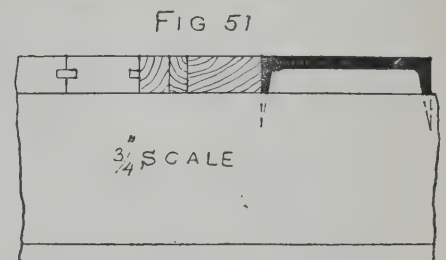
on beams or girders—a longitudinal and cross-section.

Very heavy flooring is laid in a rather different manner to the ordinary kinds. Take, for example, some of the upper floors of a warehouse or store, which, instead of being jointed, are composed of flooring 2 $\frac{1}{2}$ in. or 3in. thick, in 6in. or 7in. widths, and nailed to beams spaced from 8ft. to 10ft. from centre to centre, and supported by walls and iron columns. If the floor is longer one way than the other, the

girders are usually put across the short way (breadth), and the flooring laid the longest way (length) of the building. Sometimes this method is reversed, and a half-girder is placed along each wall resting on corbels which project from the wall for the purpose. Having the beams or girders in position as just mentioned—viz., a half-girder along each wall and a whole one or two if required between, cut down the flooring if the space is too great to get the flooring in one length, say 30ft.; then work it with 20ft. and 10ft. and break joint, that is, put a 20ft. then a 10ft., then another 20ft., and so on, making out the 30ft. with 10ft. and 20ft. alternately; when the flooring is cut down it is laid by means of dogs, wedges,



and a ledger, as follows:—the board or batten next the wall is nailed down, 5in. or 6in. spikes being used, then if the edges of the battens are grooved for slips (fillets), put them in and drive the battens as tight up as possible by means of a heavy hammer or light sledge, a piece being laid against the edge of the batten to protect it from injury, take in about 3ft. in width, then allow room for wedges and a ledger, which may be 6in. by 3in., then at this distance drive into each of the girders a dog and place the ledger within and against these; the dogs serve as stays or fixed points to resist the pressure of the wedges, and thus the



joints of the flooring are made close by the driving of the wedges; when the joints are sufficiently close the flooring is nailed down, and the process repeated until the whole floor is laid. Figs. 50 and 51 show plan and elevation of the process. The dogs are of iron, and, as is seen, have points at each end for driving into the girders; for ease in driving them a hole is bored with an auger for each a short distance into the girder. The dogs may be withdrawn by using an iron bar as a lever, and thus levering them out. It need hardly be stated that they have a heavy pressure to resist, and are usually made of iron 1in. square in section.

ERRATA.—In the last article, in the third column of p. 634, near the top of it, should have read "the bottom bevel of hip rafter"; and in the next column on, p. 635, near the top, it should have been printed "the raking bevel is seen."



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ILLUSTRATIONS.

ST. MICHAEL'S, LUCCA.—BRANKSOME MANOR, BOURNE-MOUTH.—TWO HALLS IN SURREY.—FULHAM TOWN HALL.—PROPOSED STABLES AND COACHMAN'S HOUSE, RICHMOND.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ST. MICHAEL'S, LUCCA.

THE whole of the magnificent façade of this church is constructed of white marble, and it was designed in 1188 by Giudetto, the celebrated architect who was engaged subsequently at Lucca Cathedral to decorate it in a similar manner. The general idea of the composition is supposed to have been taken from the west front of the Duomo at Pisa, built in 1063 from the plans of Buschetto, and certainly a comparison of the two designs justifies the supposition. The almost endless variety of detail and complexity of ornamentation employed in this elevation is typical of the florid style in fashion at the time of its erection; but the grand and imposing effect of the façade is insured by its dignified outline and vast scale, coupled with the beauty of the materials of which it is composed. Purists have complained of the multiplicity and irregularity of the orders of the columns in the several arcades, declaring that the proportions employed are contrary to all Classical rules of design. The upper part rises considerably above the ridge of the nave roof, and is surmounted by a colossal statue in marble of St. Michael, with huge wings constructed of bronze, and so contrived in plates of metal to allow the wind to pass freely through them, lest it should have a dangerous purchase upon so large a mass thus entirely exposed to its power. This church was founded by Teutprandus and Gumpranda, his wife, in 764, and the main portion of the fabric belongs to this date. St. Michael the Archangel at that time was estimated very highly as the favourite protector of the Lombards. During the thralldom of Lucca nothing more was done after Giudetto's west front had been added till 1377, when the lateral colonnade was built. The Campanile is a good specimen of its kind, but the glory of the church is the façade herewith illustrated. The interior consists of a nave and two aisles, separated by columns having curious Composite capitals, described by Gally Knight as "fantastic." On the corner of the west front is a good statue of the Blessed Virgin Mary seen in our view, which is an admirable reproduction from a large photograph, faithfully rendering the variety of the detail. The only picture of special merit in the church is one of four saints by Filippino Lippi, in the first chapel on the right, near the west end.

BRANKSOME MANOR HOUSE.

THIS house has been built in Branksome Park, Bournemouth, and occupies a prominent position at the junction of the old and new avenues, about half a mile from the sea, one of the chief objects of the tower being to obtain a good view of the bay above the pine trees. The walls are constructed principally of red brick; but the tower and general dressings are built

of Swanage and Bath stone respectively. It is heated on the ordinary open fire principle, with Boyle's inlets and outlets for ventilation. The hall, staircase, and all internal fittings have been executed in character, and the whole carried out to correspond, by Messrs. Lawson and Donkin, architects, Bournemouth.

TWO HALLS IN SURREY.

THESE interiors have lately been executed by Messrs. Holland and Sons in oak, for two country houses in Surrey. The drawings sufficiently explain the arrangements adopted, and indicate the style of work carried out.

FULHAM TOWN-HALL.

THE design for this building, as selected in the competition, was published by us on the 15th October, 1886. The drawings show

FULHAM TOWN HALL.



the building as it is now being erected. The foundation-stone is to be laid by the Rev. F. H. Fisher, vicar, and chairman of the Vestry, on the 10th December next. The site is on

FULHAM TOWN HALL.



the south side of the Fulham-road, nearly opposite Walham Green Railway Station. The frontage is 91ft. The large hall is 90ft. by 45ft.; the small hall 51ft. by 40ft. The front

elevation is being built in Portland stone. Mr. George Edwards, F.R.I.B.A., of 52, Cannon-street, E.C., is the architect. The general contractor is Mr. Chas. Wall, of Lots-road, Chelsea; the amount of his contract is £20,438. Mr. E. Wall is the general foreman, and Mr. G. H. Woolven is acting as clerk of works.

STABLES NEAR RICHMOND.

FOR particulars of this building see "Practical Architecture with Detailed Estimates," on page 704.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At a meeting of this Society, held on Monday night, a lecture was delivered by Mr. Arthur Marshall, A.R.I.B.A., of Nottingham, on "Old Carved Furniture and Wood-work." Mr. H. Perkin, the president, occupied the chair. Mr. Marshall remarked that art, as applied to household decoration, was beginning to receive more attention than it had done for many years. An architect's duties had been supposed to be confined to plans and designs for buildings; but it was now recognised that it was equally within the scope of the architectural profession to guide public taste as to the best style of furnishing and decoration. Alluding to chests, he said they were of early origin, and were very important pieces of furniture with our ancestors. The early examples of the 13th century were somewhat rude, and had few pretensions to architectural beauty. In the 14th and 15th centuries they became more ornamental, and in some of our village churches there still existed some magnificent examples of chests of the 15th century. The lecturer then referred to wainscoting and panelling, and noticed different varieties of chairs, and the introduction of carved chairs into England. He described various types of cabinets, Court cupboards, tables, doors, fire-places, and beds in use in the 16th and 17th centuries; and as to the adaptability of the old furniture to modern requirements, he said that in these practical times, when economy was one of the first considerations, no furniture was more capable of standing the wear and tear of our everyday business life than the quaint stolid work of the 17th century. Adverting to the question of wood-carving, he said that within the past four years the Home Arts and Industries Association alone had established more than two hundred schools and classes, in most of which wood-carving was taught. A vote of thanks was passed to Mr. Marshall, on the motion of Mr. Herbert Hodgson, seconded by Mr. Butler Wilson.

CHIPS.

New Sunday-school buildings for St. Margaret's parish, Burton-on-Trent, are being built at a cost of £1,700, from plans by Mr. R. Churchill, of that town. The materials used are Birmingham bricks, with Ancaster stone for the dressings and ornamental portions, while the roof is of tiles. The new block comprises a main schoolroom 64ft. long, 30ft. wide, and 18ft. high, and the walls have a dado of red tiles. There is also a classroom 15ft. square, and a second one 30ft. by 15ft. All the woodwork, including the furniture, is of pitch pine. Mr. George Hodges is the contractor.

Mr. Sheriff Newton, of London, laid last week the memorial stone of new Congregational schools at Sevenoaks, now in course of erection at a cost of £2,000. Mr. Wiltshire is the builder.

On Saturday an organ, costing about £800, by Messrs. Brindley and Foster, Sheffield, was opened in Selkirk parish church. At the same time a stained-glass memorial window, representing the Ascension, was unveiled in the same church.

The foundation stone of a Masonic Temple was laid at Kimberley, S.A., on the 10th ult. The cost will be £41,600, and the architect is Mr. H. A. Reid, whose design was selected in competition.

Last week we stated that the bricks for the new Bank of the Birmingham and Dudley District Banking Co. at Dudley were supplied by Messrs. King and Co., of Stonlands. The terracotta and facing bricks were supplied from the works of that firm at Stourbridge, and the bank is at Ludlow, and not Dudley.

A gold medal has been awarded to Messrs. T. Baillie and Co., for their exhibit of "Valère Translucid Enamelled Glass," at the Cardiff Exhibition, which has just been closed.









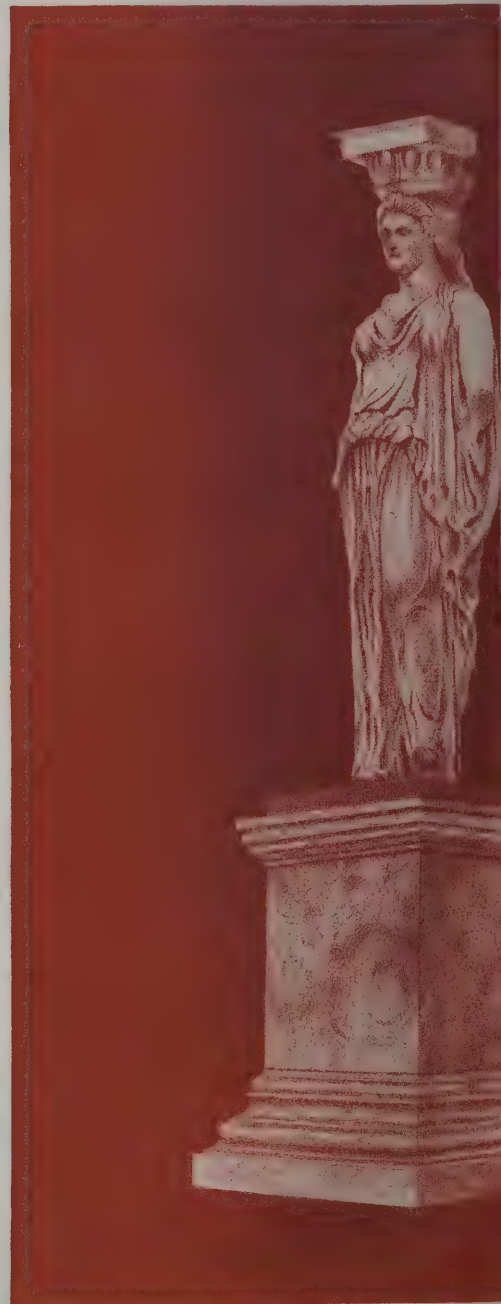
Ionic Capital.



Frieze, North Wall, Erechtheion.



Figure from Mausoleum.



Caryatid from Pandion.





(restored)



Capital from Tomb at Vulci.



Cornice &c.

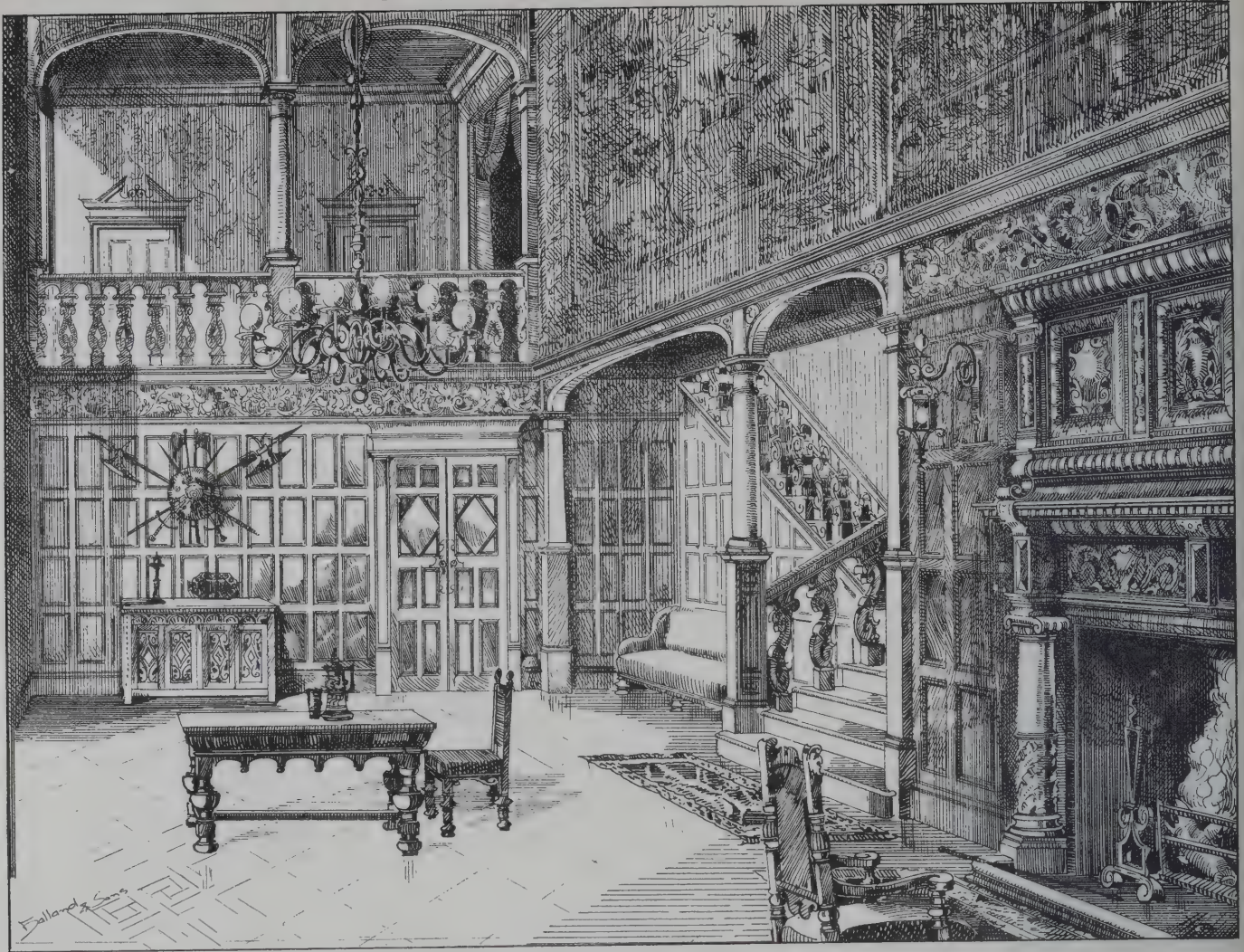




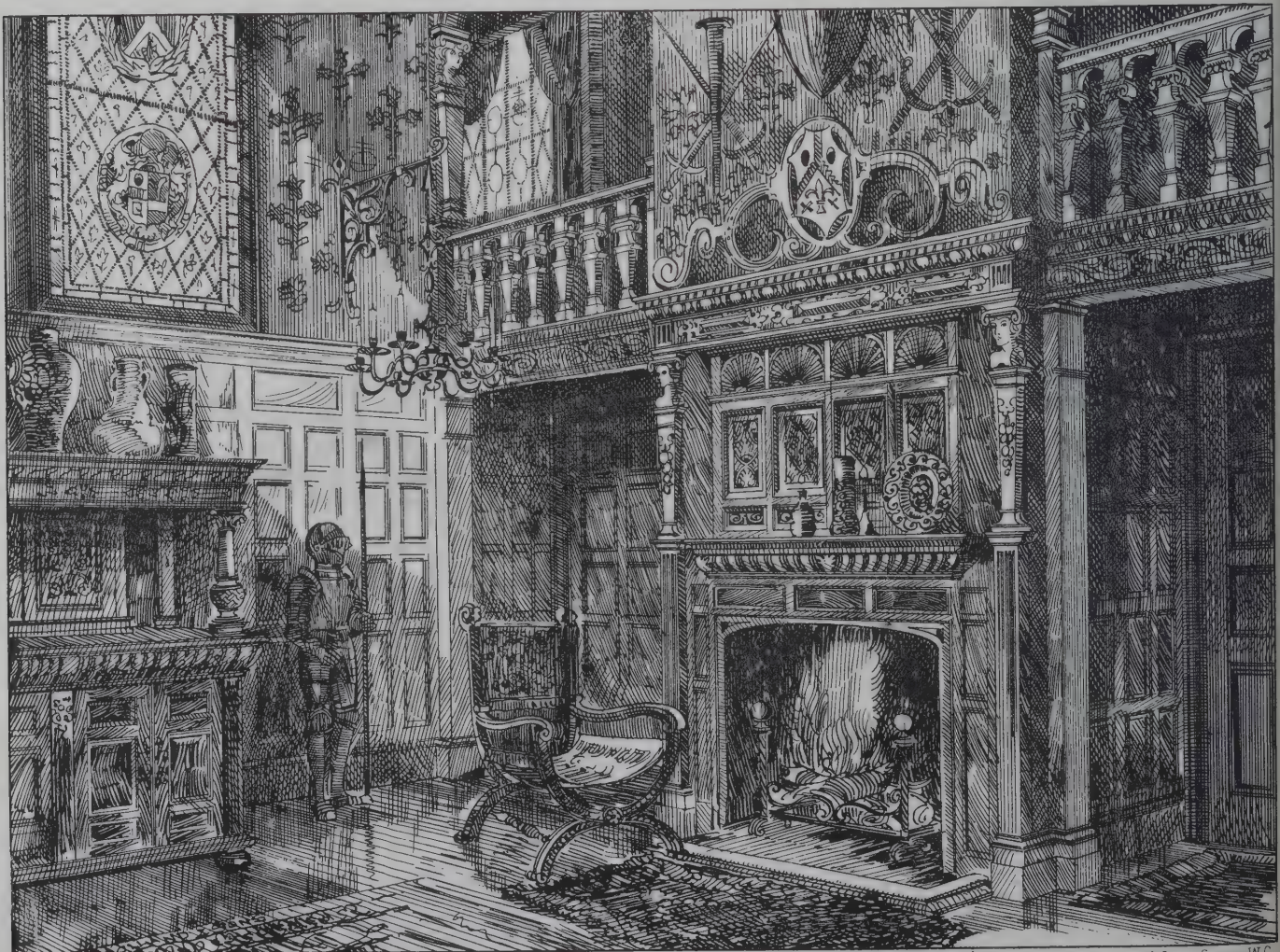








TWO HALLS IN SURREY  
EXECUTED BY MESS<sup>RS</sup> HOLLAND & SONS



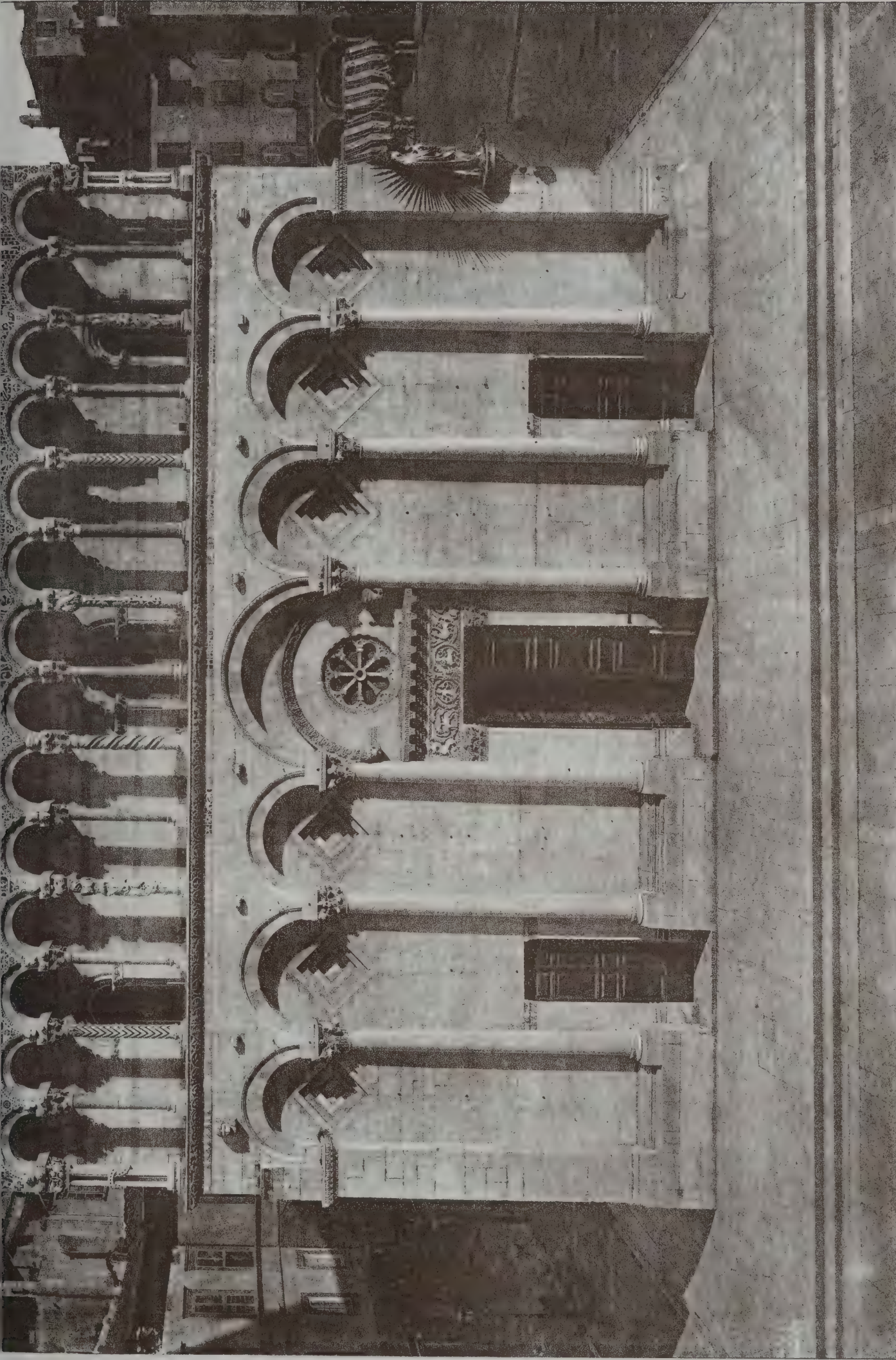












WEST FRONT OF S. MICHAELS · CHURCH · LUCCA

"Photo-Tint", by James Akerman, 6 Queen Square, London, W.C.



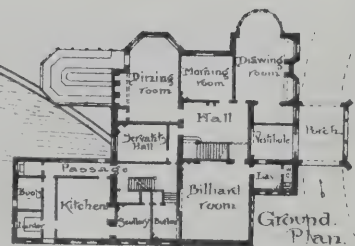




South West View of  
BRANKSOME MANOR  
BOURNEMOUTH.  
Lawson & Donkin  
Archts.



North West View of  
BRANKSOME MANOR  
BOURNEMOUTH  
Lawson & Donkin  
Archts.

















Nov. 30. 1888.









## WAYSIDE NOTES.

LD Croyland Abbey, that stands out as a veritable oasis of material beauty in a flat marshland, has been under operation for some little time, and we were before prepared to hear of more or less interesting discoveries such as that announced the rector of Croyland in the *Times* Saturday last. It appears that the workmen found that the piers of the south side of the old nave are built upon portions of columns and capitals of Norman workmanship. Although there is nothing very startling in the discovery—the mention of which was only a mere prelude to an appeal for funds wherewith to carry on the work of restoration—there is still some little interest in the fragments brought to light. They are said to closely correspond to the existing portion of the Abbey of Joffrid's time, or at the commencement of the 12th century, in which we may reasonably conclude that the work is of a somewhat rude character. The rector of Croyland says that some of the stones found are much older, and suggests that this is the result of the earthquake of 1114, in which year, says a chronicler of Croyland, there was so violent an earthquake that the "new" work at the abbey, which was then roofless, gave way, and the chancel wall cracked in so many places that the carpenters were obliged to shore it up with posts till the roof was raised. A rather amusing proceeding this; but I conclude that old carpenters knew what they were about. So whether the splits in the stones discovered are caused by the earthquake in question, I am not prepared to offer an opinion. It is a point which would rather leave to be decided by gentlemen like the Pickwick school, hoping that, after an elaborate inquiry and exhaustive research, they will not be mortified by the discovery of some plausible solution, as were the finders of the stereosily inscribed stone at the village of Ham.

noticed in the above-mentioned issue of *Times* a short account of the recent archaeological labours of M. Fournereau in Indo-China. Fournereau, it will be remembered, was charged with an archaeological mission to the ruins of Siam and Cambodia, in order to complete the collection of Cambodian antiquities now in the Trocadero Museum. At a recent meeting of the Paris Geographical Society, M. Fournereau read a report describing his explorations. It appears from this report that he has brought back from the East, casts, 13 original pieces, and 400 photographs of monuments which he inspected in the provinces of Siam, Phnombudong, Nakorn, and Cambodia, and he also brought many plans and architectural drawings. Among other places that M. Fournereau visited was Angkor-Acas, the ancient palace of kings, near Angkor-Thom. He describes this building, with its avenues of giants bearing upon enormous pillars, its heavy gates flanked by elephants, its grand temple, and fifty towers grouped in the form of a pyramid, and "forming fifty quadruple heads," as "the most fantastic creation which ever emanated from the human brain." To our Western imagination it is difficult to conjure up the effect of fifty towers arranged so as to form a pyramid, but it is doubtless very impressive. The pyramid formed, I would think, cannot be very attenuated, or the spire towers would be mere babies, while Eiffel's monstrosity would be a fool beside it in the centre. I do not quite grasp the meaning of "forming fifty quadruple heads," but conclude it is all right. As regards Fournereau's assertion that this ancient temple of the kings being the most fantastic architectural composition in the world, that is was, one can scarcely venture an opinion. One has had a glimpse of his photographs, which he is now engaged in arranging for the Trocadero Museum.

In the *Standard* of the 27th, there was a communication from the Paris correspondent on the position of the Panama Canal Company, not of very great interest to us excepting that it included an extract from an account of works on the canal by an English engineer, Thomas Collingwood Kitto—who says he has recently inspected the canal on his return

from Peru. In this report it is stated, in regard to the charges of extravagance and maladministration in the affairs at Panama, that, although there is room for much improvement, things might be very much worse. The mechanics of every grade are men of a superior order, and would command high salaries anywhere; but the petty contractors are adventurers from all parts of the world, whose only object is to get as much money as they can out of the company without doing anything for it. The report was, I believe, made on behalf of the Panama Company, and it is scarcely to be supposed that it would take anything but a cheerful view of the undertaking. Mr. Kitto says that "It is difficult to conceive why there should be enemies to such a glorious scheme as the Panama Canal." He quotes the words of an American who has studied the subject, to the effect that the opening of the Suez Canal has increased the commerce of the Pacific countries 50 per cent., and that the Panama Canal will increase the commerce of those countries fully three times as much in an equally short space of time. Mr. Kitto concludes by saying that he is quite certain that all the engineering difficulties in connection with the Canal are quite within the grasp of the administrators of the enterprise; that now the work is being concentrated on the canal itself very rapid progress will be made; and that, after examining the whole of the works in detail, he is a firm believer in the ultimate success of the scheme.

A doleful tale is that of the Commissioners for the Caledonian Canal. In their report for the year ending April 30, 1888, they show how things have gone from bad to worse during the last year or so, although, relatively speaking, the report up to April, 1887, showed some improvement in affairs. But during the latter period the expenditure has exceeded the earnings by nearly £3,800. The condition of the canal and locks is said to be deplorable. Mr. J. G. Davidson, the superintendent, condemns the design of the locks, which are scarcely workable. The locks gates are of cast iron, and from 60 to 70 years old. They are apparently rotten; and in a report appended to that of the Commissioners Mr. Davidson suggests that new ones should be constructed of oak and steel. The cost of replacement would be as great as that of putting new gates throughout the locks in the canal. The Commissioners, it is said, will be compelled to apply to Parliament for means to meet the expenditure to be incurred by putting the canal into sound repair.

The plumber is evidently the coming man! We had better prepare to play second fiddle to the craft. What with examinations, registration, interviewing representatives of the press, and lively dinners to lord mayors, sheriffs, and other dignitaries, the plumbing fraternity have been getting on of late. There is much that is admirable about the energetic measures for improvement taken by the Worshipful Company of Plumbers; but even taking into account the fact that the company is one of the oldest of the City Guilds, having been instituted in the reign of Edward III.—in A.D. 1365, to be exact—it is scarcely justified in becoming ambitious of a time when its members shall be rid of the necessity to work to architects' plans. At the dinner to the Lord Mayor last Monday, the Master is reported, in the *Times*, to have said that "he thought that the cause of the execration of modern plumbers lay in the ignorance of the public that they did not carry out their own plans, but those of other people, who were often grossly incompetent." The "other people," of course, refers to members of the architectural profession. It is to be regretted that the Master of the Plumbers' Company should have given expression to an opinion which on reflection he would have found to be utterly untenable. Still, one must forgive a post-prandial speech, which doesn't generally mean much.

Of current competitions there were two advertisements last week, one hailing from Faversham and the other from Chelsea; the former being from the committee of the Faversham Institute, and the latter from the Chelsea Hall and Club Association. Premiums of ten guineas and fifteen guineas, respectively, are offered for the improvement of the

entrances, &c., to the Faversham Institute, and for alterations to the Chelsea Hall. The competitions are perhaps best left to the wholesale competitors, whose number and energy do not seem to have in any way diminished of late. In the matter of competitions we may look out for one for a new public library at Croydon, as I notice that that town, after refusing year by year to have a free library, has at last adopted the Public Libraries Act by a very considerable majority of votes.

I have observed with very great regret the frequency of late of burglaries in churches. One of the last buildings so broken into is Olney Church, in the little village of North Buckinghamshire, which all will remember as associated with the poet Cowper. I recall with great pleasure my memories of Olney—not very extensive, it is true—only a ride through the old village whilst staying for a few days in the neighbourhood. Evening it was, I remember—or rather, a winter's afternoon—when we arrived at Olney, after a tour of inspection of the charming old stone churches and cottages in the district, including the church of Weston, with its fascinatingly beautiful doorway and windows, which I call to mind as having peculiar chamfers, slightly curved on plan, of a type I have not often met with. Approaching from Weston, the village of Olney looks very charming in the twilight. Prettily does the church spire group with the trees and cottage roofs; and, if I mistake not, it hath an elegant outline, though only having passed through the village at dusk. I will neither pretend to discourse on the beauties of its old architecture, nor to criticise the mass and outline of its spire. The latter requires much study before criticism, as there is perhaps no more delicate piece of architectural outlining—if it is to be made beautiful—than that required in the designing of a tapering belfry. GOTH.

## BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

A SPECIAL general meeting of the donors and subscribers was held at the offices, 21, New Bridge-street, E.C., on Tuesday, Nov. 27th, for the purpose of electing a pensioner on the Relief Fund. The applicant was Mrs. Elizabeth Shaw (whose case had been fully inquired into, and who had been pronounced eligible by the committee).

Being the only candidate, Mrs. Shaw was elected by show of hands, making up the number of pensioners now on the books to eighteen.

The chair was occupied by Mr. C. K. Turpin (Messrs. Kirk and Randall), in the absence of Mr. J. W. Hobbs, the President, whose duties as Mayor of Croydon prevented his attendance on the occasion.

The foundation-stone of new premises being erected for a Co-operative Society was laid last week, in Free School-lane, Lincoln. These premises will form an extension of the present large building facing Silver-street. They will have a frontage of over 80ft. to Free School-lane, and will afford cellars, shops on the ground-floor, store-rooms above, and a new reading room, library, conversation room, and committee room, &c., in the top story. Mr. F. Smith, of Manchester, is the architect, and the contract for erection has been given to Messrs. Wright and Sons, of Lincoln, the amount of the contract being £7,000.

The number of new railways projected or in course of construction within the county of Derby is probably greater than has previously been known. The most important is the line from Dore (between Chesterfield and Sheffield) and Chinley (between Matlock and Stockport). The line will be 21 miles in length, and it will shorten the Midland route between Sheffield and Manchester by 31 miles. Another important work which the Midland Company have in hand, and which is approaching completion, is known as the Ripley and Heanor Extension. Another extension—the Clown branch, in the north-east of the county—was opened by the Midland on the 1st inst.

The first section of artisans' dwellings erected in the condemned area at Wolverhampton has just been completed in Thornley-street. The houses are in the Queen Anne style. The contractor was Mr. W. Shepherd, and the architect Mr. J. Lavender.



## THE MAINTENANCE OF MACADAMISED ROADS.\*

By W. HEWITT.

ROAD maintenance is a subject to which comparatively little attention has been given in this country, although it is one of great importance, involving, as it does, inclusive of the Metropolitan macadamised roads, an annual expenditure of nearly £4,500,000. In the early part of the last century the roads were little more than cart-tracks, on which, when they got in a very bad condition, a quantity of stone of various sizes were placed indiscriminately and left to work in. Of course a road maintained in such a way as this was always in a bad condition, except when the stone was newly put on, and then it was too rough and uneven for the traffic to pass easily over it. In some districts where stone was scarce the road would be mended in the autumn with brushwood, mud, &c., with a layer of stone on the top; but in a short time this road, especially in wet weather, became in a much worse state than before. The method of making a new road was to dig a trench of the required width and deposit a layer of large stones in it and another of small on the top of them. This was left to itself and allowed to consolidate in the best way it could. The thickness of these layers varied according to the idea of the surveyor, and, as he was generally a man possessing no experience of road-making or maintaining, it was not to be expected that he would know anything about the work he had to superintend. Things went on in this way until the establishment by law of turnpike trusts. But it appears this did not do much good. The trusts were in short lengths, sometimes not more than 20 miles, and the surveyors were no better than before, as they were more frequently appointed by favour than for any qualifications which they possessed for the office. This state of things continued until the time of Macadam and Telford (about the commencement of the present century), when great improvements were made; the stone was broken to a more uniform size, and greater attention was paid to drainage. Macadam's principle was "to put broken stone upon a road which shall unite by its own angles so as to form a solid, hard surface," and this by universal experience since has been allowed to be correct. He also contended that no greater convexity should be given to the cross section of a road than was necessary to carry off the surface water into the water-tables. He did not agree with Telford in one important particular — namely, that a road should have some sort of hard foundation, either a rough hand-set pavement, or a layer of rough stone or gravel for the broken stone to be placed on, preferring to lay the metalling on the formation surface. Experience, however, has since shown that Telford's method was the right one. A great deal has been said about the disagreement between these two eminent men on this particular subject, but it is very evident that they agreed in a great deal more than they differed; and it is by a combination of their methods, united with recent improvements, that the best roads are now made and maintained. In laying out a new road the general lines must always be controlled, more or less, by the surface formation of the locality. Cuttings and embankments should be avoided as much as possible, owing to their great expense, and when unavoidable the work should be so arranged, as far as possible, that the soil removed in cutting can be used for the embankment. It is essential that the formation of a road should be thoroughly drained, whether it has a paved bottom or not. This is usually done by ditches on each side of the road. They should be from 2ft. to 3ft. below the level of the surface of the road. They are sometimes on the land side of the fence and sometimes on the road side; but it is preferable to have them on the latter, as the roadmen can more easily get at them to clean them out, and it also gives a greater width between the fences, which is a great aid in drying the road, as the air has freer access to it. When the ditches are on the land side of the fence, in most cases they belong to the owners of the property, and the occupiers are supposed to clean and scour them,

which there is sometimes great difficulty in getting them to do. When they are on the road side there should be, unless there are footpaths, and when the width will allow, sod borders between the metalled portion of the road and the side ditches, with outlet cuts at short intervals to lead the water away from the surface of the road. In some parts of the country great objection has been made by some members of highway boards to their formation, and they assert that sod borders cause greater expense in the maintenance of the road. This, however, is an error: they may be formed and maintained very inexpensively, and it does not cost nearly so much for trimming the edges and cleaning the outlets as it does to clean the sides of a road by stocking up the weeds and grass. These always accumulate where, as on most country roads, the whole width is not used, and where there is no sod border there is always great expense caused by these operations, which injure the road by admitting the wet, besides being very unsightly; whereas the sod border, when properly kept and trimmed, adds to the appearance of the road and facilitates the flowing away of the surface water. It should be from four to six inches high, as this would not be high enough to endanger vehicles, and yet high enough to keep anyone from driving into the ditches in the dark. Where there are many houses on the sides of the road it becomes necessary to have a footpath, and this should be formed over the side ditch, as it is always better to have a drain under the footpath than under the road. In such a case it is always best to lay some kind of kerbing and channelling at the side of the road, the nature of which must be determined by the locality, as when once down it costs less in such a situation to keep clean than anything else would. Small drains communicating with the underdrains should be carried under the footpath at intervals so as to carry off the surface water. All side ditches, outlets, borders, &c., should be thoroughly cleaned out and trimmed in the autumn, and gone over again, where necessary, in the spring. If this work is done in the summer it causes a great deal of useless trouble and expense, as the grass and weeds then grow so rapidly, necessitating the doing of the work over again. In addition to the side drains, cross drains are necessary in most cases so as to thoroughly drain the centre of the foundation of the road. These are usually pipe drains, and should communicate directly with the side drains, the fall from the centre to the sides being from 1 in 80 to 1 in 100. In districts where stone is plentiful, box drains are generally used, as being much cheaper. They are of square section, and are formed with flat stones for the top and bottom, and stone sides. The great advantage of these drains is that they can be so readily opened for cleaning by taking off the top stones. Sometimes it is advantageous to construct mitre or V drains; they are formed as ordinary drains, but in the shape of a flat V, with the centre uphill. In many instances a cheap and effective drain may be formed by cutting a trench about a foot square in the formation surface, and filling it with large rough stones. The intervals at which these drains should be placed must depend on the nature of the subsoil and the quantity of water in it. With a clay subsoil they must be at shorter intervals than in gravel or sandy soil. Where there are footpaths, catch-pits or gullies may be used for the surface water, and should be connected directly with the cross drains. Any springs that may make their appearance must be immediately tapped and led away to the side ditches. With a good system of cross drainage there is no advantage in constructing longitudinal drains immediately under the water-tables in addition to the side drains. On roads which are formed on sidelong ground and benched into the hillside it is nearly always necessary to have a drain in the side of the hill above the road to keep the land water from the road; but the form of this must be determined by local circumstances. A very common and inexpensive way is by cutting a deep trench and filling it with large stones. Whatever system may be adopted in such cases the drains should be connected, at intervals, directly with culverts, so as to convey the water under the road and away from the upper side as quickly as possible. In many instances, particularly in hilly districts, no outlet can be

found for the water on one side of the road. In such cases provision must be made for conveying it under the road at intervals by means of large drains or culverts. These are usually pipes of large diameter, or may be large box-drains, with the walls either built dry or with mortar; the larger ones being generally built with brick or stone walls, and with a turned arch similar to a bridge. In all cases an inverted should be formed, either by an inverted arch or a flat pitched invert, or the walls would be rapidly undermined by the water. Barrel culverts, of circular section and built of bricks, are now rarely used. It will sometimes be found necessary to go to considerable expense to thoroughly drain a road, but in the end it will always be found to be most economical to do so, as a wet, undrained road is always most expensive to keep in good order. All underdrains and culverts, unless of very large size, should have an iron grating at the entrance, to prevent their getting choked with the rubbish which is always brought down at the commencement of a storm. It is essential that the cross-section of a road, when completed, shall be such as will allow the water to flow freely off it; yet care must be taken that it is not too round, or else the traffic will always keep to the centre and form ruts, which will retain the water, and thus cause great damage to the road by soaking into and thereby weakening it. The best form for general purposes, I believe, for the cross-section, is an arc of a circle, having a fall of 1 in 30 from the centre to the sides of the road. A road should never be quite level longitudinally, or the water will stand in the gutters instead of flowing away freely; so that, even in quite level ground, it is better to go to a slight expense to obtain such a fall as will enable the water to get away easily. Steep gradients should be avoided where possible. No road should ever be made with a gradient steeper than 1 in 30, but 1 in 50 is much better for general purposes, especially when practicable without much greater cost, for the after expense of maintenance will be much less. Great damage is caused to a road by the feet of the horses when drawing heavy loads uphill, and also by the drags on vehicles descending, by causing a disintegration of the surface. Much injury is frequently caused by water scouring the surface of a hilly road, sometimes the whole coat of surface metalling being swept away. When a road is formed by being benched into the hillside, a retaining-wall is frequently needed to prevent the earth falling on to it. When the cross-section of the road is formed partly by cutting into the hillside and partly by an embankment, a retaining-wall will generally be needed on the other side also, and below the road. The section and strength of these walls must always vary very much, and must altogether depend on local surroundings and requirements. The width of a country road should never be less than 16ft. of metalled surface. On a road where there is great traffic the width should be such as will readily accommodate it, and, within certain limits, the wider a road is in proportion to the traffic, the less it will cost to keep in good order. The formation surface of a road, when the drainage is completed, should be well rolled, so as to consolidate it, before the foundation is laid on it; the foundation is usually, in the case of streets or roads with heavy traffic, a pavement of rough flat stone set on edge and formed to the same cross-section as the road will have when finished, the interstices being filled with small pieces hand-set with a hammer. Sometimes it is of concrete formed to a similar cross-section.

(To be continued.)

ROBERT BOYLE AND SON, LIMITED.

THE third annual general meeting of this company was held at the Cannon-street Hotel on the 21st inst. The secretary (Mr. J. A. Dargue) having read the notice convening the meeting, the Chairman said: It is quite unnecessary to read the report which has been placed in your hands, and I daresay read by all of you, and likewise the balance-sheet accompanying it, and, therefore, it simply becomes my duty, and a very pleasant duty it is, to tell you that we are again prepared to pay you a dividend of 12 per cent. In many companies

\* Read at the Ordinary General Meeting of the Surveyors' Institution, Nov. 26, 1888.



the chairman on these occasions has to gild the bitter pill that the shareholders have to swallow, but in this case the pill is of solid gold in the shape of £12 for every £100 invested, and consequently the work of the chairman is very easy. I may say that, from the personal knowledge I have obtained of the position of the company, I am persuaded that next year and the year after next—I think we can see forward as far as that—are not likely to be one iota less prosperous than the years gone before. From the orders we have in hand, and others which we know are coming in, we are in a position to say that the year we are now entering upon will, in all likelihood, be even more prosperous than that just closed. Mr. H. P. Stebbing seconded the resolution. There being no questions, the report and accounts were then unanimously adopted. The directors and auditors having been re-elected, Mr. Stebbing proposed a vote of thanks to the chairman and directors for their excellent management of their business during the year, and suggested for their consideration the addition to the board of another director, residing in London, to assist them in their labours. Mr. Eckstein seconded the resolution, pointing out as a satisfactory feature of the management of the company the small amount down for bad debts in the accounts submitted. The resolution was unanimously carried. Mr. Robert Boyle, in acknowledging the vote on behalf of the board, said: I am glad to say that the demand for the various ventilating appliances manufactured by the company continues to increase both at home and abroad, which may be said to be owing, to a considerable extent, to not only our constant efforts to meet the requirements of our clients, but to the well-proved superiority of the latest improved form of the air pump ventilator, patented in 1882, which is much more efficient and reliable than any of the previous forms, and is now sold at about 50 per cent. less than the inferior forms formerly manufactured; at the same time the ventilators are now made of a more ornamental character, and of the best rolled steel plates, galvanised, and painted with enamel paint, whilst the workmanship is of the highest class. Though this, of course, has very considerably reduced our profit on each article, the remarkable increase in the sales, which has resulted from thus reducing our prices to a minimum whilst providing nothing but what is of the best quality, has enabled us to not only again pay a dividend of 12 per cent., but to place one-sixth of the profits to the reserve fund, besides carrying a substantial balance, £1,248 11s. 1d., forward to next year. The orders and sales for the past year show, I am pleased to say, a very satisfactory increase on the previous year, though that year was an exceptionally good one, whilst the profits are increased in proportion. I am pleased to say that the foreign agencies continue to develop in a very satisfactory manner and to yield good results, the air-pump ventilator and other appliances being introduced with considerable success to a large number of important public buildings in Germany, France, Belgium—where the system was applied to the Brussels Exhibition buildings—Holland—one contract being just executed at the Hague, embracing seventy-six air-pump ventilators—Spain, America, the Colonies, and other countries. The ventilators have also been adopted in the Dutch Navy, and other important contracts for the ventilation of ships have been secured and executed. Agencies have been established during the year in Norway and Sweden, also in Russia and Italy, and a considerable addition to the business from these sources may be expected.

Mr. Stebbing asked a question regarding orders for railway carriage ventilators for Germany. Mr. Boyle said experiments were being made by the German Government on their different lines; but those interested were very careful in coming to a decision, as the substitution of the company's ventilators for those at present in use involved a radical change from the existing system. He might add that he had recently visited the principal towns of Italy, and he was satisfied, from what he saw, that with proper push a fair business could be obtained. He understood that the company was going to be invited to furnish a scheme for the ventilation of the Italian Houses of Parliament, and estimates were at

present being prepared for the ventilation of a number of important public buildings in Milan and other towns.

### COMPETITIONS.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The report of the Work Class Committee states that the prizes offered for drawings in the three sections were given for the following subjects:—(1) "A Mansion in the Scottish Style," for the class section, conducted by Mr. MacGibbon; (2) "Interior Woodwork," conducted by Mr. R. Cameron; and (3) "A Church: Renaissance Style," conducted by Mr. Frank Simon. The designs were submitted under mottoes. The awards have been made as follows:—First section.—First prize, Mr. John Begg, 73, George-street; second prize, R. S. Lorimer, 19, St. Andrew-square, and Victor Horsburgh, 19, St. Andrew-square, equal. Second section.—First prize, Victor Horsburgh; second prize, G. M. Ford, 65a, George-street. Third Section.—First prize, J. N. Scott, 73, George-street; second prize, R. S. Lorimer and John Begg, equal.

NEWTON HEATH, MANCHESTER.—The Newton Heath Local Board are providing a series of public buildings. They will comprise a public assembly-room, with the necessary adjuncts; public baths, science and art schools, and a free library, besides some extensions of the present offices. The board invited architects, without restriction, to submit designs under motto. Particulars setting forth their requirements were prepared by their surveyor, Mr. James P. Wilkinson, C.E., for competitors, and premiums amounting in the aggregate to £100 were offered for the best four designs. About twenty submitted designs. These were referred to the board's surveyor, and his report the committee adopted. It was found that the author of "Gordon," the premiated design (£50), was Mr. Lawrence Booth, of Manchester, and he was appointed architect. The second prize (£20) was awarded to "Plan," which was found to be by Mr. John Johnson, of 9, Victoria-street, Mansion House, London. The third and fourth prizes were divided between Messrs. Maxwell and Tuke ("Sir Isaac") and Messrs. M'Leod and Earnshaw ("Public Buildings"), all of Manchester. The principal external feature of Mr. Booth's design is a clock-tower of great height, to be placed at the corner of Oldham-road and Wellock-street. This, in its proportions and architectural treatment, is suggestive of a Venetian campanile, and is intended to mark the principal entrance to the public hall. This room is 80ft. by 40ft. internally, and 28ft. in height, and has another convenient approach from Wellock-street. The utmost facility for ingress and egress is thus provided, and the necessity for staircases is obviated. There are also the usual retiring-rooms and other conveniences. The public baths are situated in Wellock-street, and are, in their general arrangements, almost identical with the Salford Corporation Baths at Pendleton, which were designed by the same architect, and erected on a somewhat similar site. They comprise a first-class and a second-class swimming bath, the former of which is designed for the use of ladies whenever desired. There are six first-class and twelve second-class slipper baths for men; and three first and three second-class baths for ladies. The baths are all on the ground-floor, and are lighted directly from the roof. The ticket office is placed between the two pavilions containing the swimming baths; the laundry, storeroom, &c., are behind, and there is a residence for the caretaker on the first and second floors. This group of buildings completes an elevation 267ft. in length to Wellock-street, the length of the Oldham-road frontage being 151ft. The corresponding area of land on the opposite or Manchester side of the plot, and fronting to an intended street, will be occupied by the free library on the ground-floor, and the science and art schools on the first floor. The library contains a public reading-room, boys' reading-room, library proper, librarian's room, and the usual accessories. The science and art schools have separate rooms for teaching theoretical science subjects, as mechanical and engineering drawing, machine construction, &c.; practical science subjects, as chemistry (with laboratory accommodation), and art drawing and design.

The extension of the present offices includes some additional accommodation for the surveyor and the clerk to the board, and the provision of additional strong rooms, &c. The designer had to tax his ingenuity in endeavouring to follow the suggestion that the new buildings should harmonise with the present offices. The latter have little pretension to be treated as a prominent feature of such a pile as that in contemplation; but beyond taking down the present clock turret and making certain structural alterations, he has proposed to leave them, in outward appearance, very much as they are. The several works will be executed with all despatch.

## Engineering Notes.

WESTON-SUPER-MARE.—The series of public improvements to the sea front at Weston-super-Mare, which has been in progress since 1880, has just been completed. Mr. T. J. Scoones has been the engineer throughout, and some £30,000 has been expended in five contracts. The first contract, executed by Mr. A. Krauss, contractor, of Bristol, comprised the main portion of the esplanade and drive from the Sanatorium to Anchor Head. The total length of the esplanade is about a mile and three-quarters. The second contract was also executed by Mr. Krauss—who continued the esplanade from Anchor Head to the pier—and also included the alteration of Prince Consort Gardens, laying out the same in terraces, and the carrying of a new road from opposite the Pier Hotel to Kew-stoke-road. The third contract, further executed by Mr. Krauss, comprised the erection of an additional shelter in Glentworth Bay. The fourth contract represented the work of altering the buildings in Prince Consort Gardens, and adapting them for cloakrooms; this work was executed by Mr. A. J. Marshall, of Weston-super-Mare. The fifth contract was that for the boating slip, which was carried out by Mr. H. A. Forse, contractor, of Bristol; the public are now able to embark or land from boats at any state of the tide, except for a short period during a low spring tide.

### CHIPS.

Convocation of Oxford University has conferred the degree of D.C.L. *honoris causa* upon Mr. Joseph Prestwich, F.R.S., late Professor of Geology.

On Sunday a new reredos of Caen stone was unveiled at the parish church of Willaston, in the Hundred of Wirral. It was given by Mr. Duncan Graham, together with an enlarged vestry, new window, and new cloister seats, at a cost of £300. The central arch of an arcade of five arches contains within a vesica a representation of the "Agnus Dei." The four side panels represent the emblems of the four Evangelists. Mr. Joseph Rogerson, of Liverpool, is the sculptor employed, and the work has been designed by Mr. David Walker.

A new highway bridge is in course of erection over the river Itchen, at Northam, a suburb of Southampton. Mr. G. F. L. Giles is the engineer, and Mr. H. I. Sanders the contractor.

The members of the London and Middlesex Archaeological Society met on Thursday evening, the 22nd inst., in the Mercers' Company's hall, Cheap-side, when Dr. Freshfield, the president, delivered an address, and papers were read by Messrs. J. Watson on "St. Thomas' Hospital, Acton," and E. W. Brabrook on "The History of the Mercers' Company."

Mr. J. Leak, architect, of Leeds, has been elected on the school board of that town, having received 32,333 votes in the severest contest yet known in Leeds.

The Bishop of Norwich has just reopened the 14th-century parish church of St. Margaret, Upton, which has been restored at a cost of over £2,000.

Plans prepared by Mr. Charles C. Jones, M.S.A., architect, Charles-street, Cardiff, have been submitted to the Education Department for utilising the old St. David's Catholic Church, Cardiff, as an infants' school.

New workrooms, showrooms, &c., and additions to shop of Messrs. Burton and Sharpley, Queen-street, Cardiff, are to be carried out from plans prepared by Mr. Charles C. Jones, M.S.A., 44, Charles-street, Cardiff.



## Building Intelligence.

**BOURNEMOUTH.**—The rapid growth of Bournemouth in popular favour and in actual size has induced the proprietors of the Hotel Mont Dore to carry out some important extensions and improvements. At the west end a new wing has been added. At the opposite extreme are a winter garden and a commodious covered tennis-court. The whole of the hotel and recent additions are fitted with electric light. An entirely new hydraulic lift service has been erected by Messrs. Archibald Smith and Stevens, of London, consisting of two of their patent "Reliance" lifts and requisite power machinery. One lift has an unusually handsome cage in hard wood, with hand-painted panels and electric light. This conveys passengers to all floors, and is available at all hours. Having regard to the peculiar requirements of a hydropathic, special precautions have been employed to insure the silent running of the lifts, although the ascent may be made in eighteen seconds, and either car can make forty-eight complete trips up and down per hour. The pressure used is 700lb. per square inch, supplied through an accumulator by some especially designed steam-pumps. These are of duplex type, with ram and bucket pump ends, and run with absolute silence. They are fixed at some considerable distance from the accumulator, necessitating some different system of automatic control from the chain arrangement usually employed. This is given by a very simple valve in the steam-pipe, in which the steam pressure is used in opposition to the hydraulic pressure, each being alternately caused to preponderate by hydraulic connection from the accumulator. The movement of the controlling valve is virtually invisible, with the result that immediately a lift at the far end of the building commences to ascend, the pump starts into motion by no visible agency, and continues working until the water consumed is replaced, when it stops in the same manner, only to restart at the next draught of water, the entire system being automatic and silent. The work has been carried out under the superintendence of Mr. S. Chadwick, Parliament-street, as architect, and Mr. K. Mackenzie, of 15, Great George-street, as consulting engineer. The builder was Mr. M. Williams, of Bournemouth, and the tennis-court was erected by Mr. Humphries, of Knightsbridge.

**NUTFIELD.**—Christ Church, South Nutfield, Surrey, was consecrated on Friday last. It is situated on the picturesque estate of Sir Henry Edwards, and near Nutfield Station. It consists of a nave, 68ft. by 26ft. 6in. wide, with a chancel, vestry, tower, and spire. Mr. Edward B. l'Anson, of Lawrence Pountney-lane, City, the architect, has treated the structure in the Early English period, the walls being faced inside with red bricks, and the dressings of doors and the tracery of windows being executed in Bath stone. The roof is covered with tiles; and the spire, which rises to the height of about 80ft., is covered with oak shingle. There are 280 sittings. The cost of building the church and vicarage has amounted to £3,424. The contract for building the church and the vicarage was let to Messrs. Balaam Bros., of Old Kent-road. The church is heated by Grundy's apparatus.

**RISHTON, NEAR BLACKBURN.**—The Church of SS. Peter and Paul, Rishton, will be reopened on Sunday next, December 2nd, after being closed over two months, during which time the edifice has been decorated and a new organ placed in the church in one of the transepts. The work has been carried out from drawings prepared by Messrs. Simpson and Duckworth, architects, Blackburn, by Messrs. Heighway and Son, decorators, Manchester. The general colouring is in light and warm tones, in harmony with the prevailing tints of the stonework. The nave and aisles are painted in light terracotta, with cream bands and stencilled ornaments, the transepts being more elaborately decorated. The decorations of the chancel are effective. On the east wall are painted full-sized figures of the patron saints on gold-ground panels.

**TURTON.**—Important alterations and additions have been made at St. Anne's Church,

Turton, near Bolton, the chancel having been enlarged, a reredos erected, and other improvements carried out. The chancel is now extended some 10ft. eastwards, the east wall having been taken down and rebuilt. The choir-stalls are brought forward into the body of the church to form a quasi-chancel; the vestry on the south side has been extended, and on the north side a new organ-chamber has been built. A chancel arch has been formed at the intersection of the chancel and nave, and the chancel ceiling is panelled and boarded; the floor is laid with encaustic tiles of a suitable character. The chancel is separated from the body of the church by a low oak screen, panelled and moulded. The choir-stalls and prayer-desks are also in oak, with elaborately panelled framing in fronts and bench ends. The old east window, which is filled with stained glass, has been taken out and replaced in the new wall. The Renaissance treatment of the glass in this window (which is the work of Messrs. Heaton, Butler, and Baynes) has been taken as a guide for the style adopted in the other work in connection with the chancel, which has been made to harmonise with it. The old pulpit and the bookcase containing the chained books will be replaced as near as possible in their previous positions. The reredos is constructed of alabaster of different shades, which is like the other new fittings, Renaissance in character. The centre portion is in two panels of pure white alabaster, carved with figure subjects—"The Presentation in the Temple," and the "Transfiguration of our Lord." The reredos is 9ft. 4in. high in the centre, and 17ft. at each side, being 24ft. in width. The whole of this work, including the carving, has been carried out (from full-sized drawings prepared by the architect, Mr. R. Knill Freeman, F.R.I.B.A., of Bolton), by Messrs. Earp, Son, and Hobbs, of London and Manchester. The building has been carried out by Messrs. Martin Bros., of Edgworth; Messrs. Marsh and Mayoh undertook the masonry; and Mr. W. Bridge the plastering.

**VRYNWY.**—The church which has been erected by the Corporation of Liverpool in place of the old parish church, the site of which is to be submerged along with the rest of the village of Llanwddyn by the waters of the lake Vyrnwy—the great artificial reservoir for supplying Liverpool with water—was consecrated on Tuesday by the Bishop of Bangor. The new church, which is dedicated to St. Wyddyn, is distant about two miles from the old church, dedicated to St. John the Baptist, and occupies an elevated position, overlooking the great Vyrnwy embankment. It is Early English in style, except the south door, which is Transitional Norman, and has an oaken porch. The church provides accommodation for nearly 200 persons. A vicarage has also been erected close to the church. The architect of both church and vicarage is Mr. Francis U. Holme, of the firm of Messrs. F. and G. Holme, Liverpool; and the contractors were Messrs. Hughes and Owen, Wrexham. The oakwork and pews of church were supplied by Messrs. Norbury and Pattison, Liverpool, and the tiled floors by Mr. Swift. Mr. John Sadler, of Widnes, was clerk of works.

### CHIPS.

The Rev. Melville Horne Scott, vicar of St. Mary's, Lichfield, has been appointed Archdeacon of Stafford. Mr. Scott is a Cambridge man, and is a brother of the late Sir Gilbert Scott.

Saturday and Sunday were the first anniversaries of the deaths of the Earl and Countess of Dalhousie, and the occasion was marked by the unveiling of a tablet erected to their memory in Cockpen Parish Church by the tenantry and servants of the Mid-Lothian estate. A memorial cross was also erected last week at the grave of the late Earl and Countess in the churchyard. The design, which is an adaptation of one of the Early Celtic crosses, has been worked out in unpolished red granite. On the upper part of the cross the surface is filled in with interlacing ornament. The structure has an elevation of about 11ft. The tablets and cross were designed and executed by Messrs. S. McGlashen and Son, of Edinburgh.

The workmen employed on the repairs now in progress at Croyland Abbey found the piers of the south arcade of old nave built upon column-stones and capitals of Norman work used as spreading-footings. The portions so found correspond to the existing portions of Joffrid's Abbey (A.D. 1113).

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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### ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of eight words, the first line counting as two, the minimum charge being 5s. for four lines.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII., XLVI., XLIX., L., LI., LII., LIII., and LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—J. S.—P. Co.—T. and R. B.—T. A.—W. F. S. K. and S. C.—F. H. Co.

STUDENT. (Inquire at Batsford's, 52, High Holborn.)—FAIRPLAY. (Letters making such charges must bear the names and addresses of senders.)

### "BUILDING NEWS" DESIGNING CLUB.

#### SECOND LIST OF SUBJECTS.

B.—A pair of Suburban Villas standing on a site having 60ft. frontage and 110ft. deep. The accommodation to be provided is to include a parlour or drawing-room 18ft by 15ft., a dining-room 20ft. by 15ft., kitchen 14ft. by 12ft., entrance hall, and a staircase not facing the entrance, cloak cupboard, store cupboard, scullery, pantry, larder, coal-place, servants' w.c., and a tool-house. On the first floor, three bedrooms, one adopted for a nursery, and a bath-room, with separate w.c. The top floor to provide four bedrooms and a box and elstern-room. Style, 17th-century Domestic, in red brick, with stone dressings sparingly used. Cost, about £1,600 the pair. Scale, 1/4 inch to the foot. Sketch and drawings sufficient to illustrate the design.

C. A Dining-room Suite of Furniture in walnut suitable for the above house. A 5ft. buffet, an arm-chair, and chimney-piece at least to be illustrated. Scale, half-inch to the foot.

DRAWINGS RECEIVED.—"Wallaby," "Myth," "Stanley," "Westward Ho," "Pecksniff," "Olympic," "Malvolio," "Deb," "Gradorothy," "Steam Hammer," "Judge Pitman," "Illinois," "Unitas," "Nomad," "Terra Cotta," "Zodiac," "Homo," "Bog Oak," "First Attempt," "Iota," "Mephisto," "Pecksniff" No. 2 (Colchester), "Wheesht," "Oak," "Horseshoe," "Excelsior," "The Idea," "Country Cousin," "Dun Elm."

## Correspondence.

### COLUMNS AND STRUTS.

To the Editor of the BUILDING NEWS.

SIR,—I am obliged to Colonel Cunningham for drawing my attention to the misprints in my article under the above title, which appeared in yours of November 16th. I need scarcely say that they would not have been made had I had an opportunity of looking over the proofs.

The word "mechanical" should read "mathe-



matical." The formulæ should be as follows:—

$$W = \frac{FK}{1 + C \frac{l^2}{K^2}} \text{ and } F = W \left( \frac{1 + C \frac{l^2}{K^2}}{K} \right)$$

The words referring readers to the diagrams 53 to 62 for the values of  $k^2$  for different sections were omitted. These diagrams appeared in the previous issue.—I am, &c.,  
G. A. T. MIDDLETON.

## Intercommunication.

### QUESTIONS.

[9842.]—**Cleaning Marble.**—I should be very glad to get a safe method of removing bee's-wax from polished marble columns. The bee's-wax was applied to protect the columns, and in removing it I do not wish to injure the polish. Soft scap has been tried without success.—S. E. D.

[9843.]—**Stable Paint.**—New red deal boarding fixed to walls of stable with inch cavity between, ventilated to the outer air, has been painted three coats, grained oak, and varnished. In moist weath r surface turns quite white in patches all over, which disappears when weather becomes drier. Can the cause be suggested, and the remedy?—PAINTER.

[9844.]—**Stamp Duties.**—Do the following require to be stamped if made by a licensed appraiser? Will "H.S." or some other reader oblige? 1. Valuation of property made for the purpose of obtaining or trying to obtain mortgage on same? 2. Valuation of labour and materials to enable another person to send in an estimate for proposed new buildings or other works? 3. Valuation by an architect of any additional or extra work over and above contract estimate of cost? 4. Valuation by an architect (or any other person) of the cost of carrying out work comprised in plans and specifications of proposed new building or repairs to old? 5. Checking charges made in tradesmen's bills for satisfaction of employer? If the amount be reduced, would this be a valuation and require stamp, and, if so, would stamp be of such a value as to cover full amount of account? 6. Measuring up work and making out bill of same (including pricing) for tradesman to send in to employer?—DOUBTFUL.

[9845.]—**Magnesian Limestone and Cement.**—In the BUILDING NEWS of 7th Jan'y, 1887, p. 5, reference is made to some experiments made by the late Dr. Orace Calvert on the use of magnesian limestone in making cements for the Dinorban Co., Anglesea. Can anyone inform me where a detail of these experiments is to be found?—W. T. DENT.

[9846.]—**Pumice-stone Floor.**—Mention was made in his address by the President of the Society of Architects of a new pumice-stone floor. Will Mr. Seth-Smith kindly give further particulars, and say if it is as cheap as a good wooden floor of ordinary construction, and the name of the manufacturer?—INQUISITIVE.

[9847.]—**Wooden or Iron Churches.**—Which is the better material to use for a temporary church—wood or iron, looking at the points of comparative original cost, repairs, maintenance, and the comfort of worshippers? For how long a period will the Metropolitan Board of Works permit the use of a structure of either material?—TEMPORARY.

[9848.]—**Liability of Landowner.**—Last Christmas, through an agent who wrote to me, I entered into an agreement with a builder to let some land at £30 per annum, with one year's peppercorn, the builder to build twelve cottages in twelve months, and to have the option of purchasing the ground rent at 20 years' purchase. The builder built five houses, which were leased to him, and the agent was paid half the commission. The builder has, through a third person, called upon me to execute a conveyance of the freehold at 20 years' purchase. Although there was only one agreement, the agent demands of me a year's ground rent, and also 2½ per cent. on a sale of the freehold. Although my agreement only refers to ground-rent, I am called upon to execute a conveyance of the freehold. I shall be glad if some of your readers will enlighten me as to what my liability is to the agent.—R. W.

[9849.]—**Valuations.**—Can any of the readers of your paper kindly inform me which are the best works published upon the above subject?—ENQUIRER.

[9850.]—**Powers of Local Authority.**—Under the Public Health Act a local authority is bound to provide an outlet for the sewerage of the adjacent districts on terms to be settled by the local magistrates or by arbitration. On what basis are claims of this kind framed? What would be a fair charge for the use of a main sewer to take the drainage of about twelve acres of land which lies outside the local board district?—ARCHITECT.

### REPLIES.

[9767.]—**Apprentices.**—I should recommend the drawing school at South Kensington for a year or two; then the boy will be able to get a salary in an architect's office.—O. F. M.

[9819.]—**Cement, &c.; Measure Boxes.**—Get what is commonly used—viz., a half-yard measure, that is a box 3ft. by 3ft. by 1ft. 6in. deep. Put the coarse stuff into this to the depth of 12in., then fill the remaining 6in. of the box with the fine stuff. Your cement box may be 1ft. 6in. by 1ft. 6in. by 1ft. deep, which is 1-6th of the half-yard measure—thus you have 4, 2, and 1 parts. This will be workmanlike and fair to all parties concerned. I am doubtful about finding a foreman who would allow his men to be hampered in their work by three measure boxes.—G. A. S.

[9829.]—**Banruptcy of Contractor.**—If "Spes" likes to send me his address, I will forward him an account of how, under similar circumstances, a firm of co-opera-

tive builders has been successfully formed.—CHARLES F. MOKON, Beach Cliff, Westgate-on-Sea.

[9830.]—**Professional Charges.**—"A." can charge his client for plan, specification, and quantities the customary commissions, or 2½ per cent. for plans and specification, ½ per cent. for procuring tenders, and say 2 per cent. for quantities.—G. H. G.

[9832.]—**Swimming Baths.**—"Natator" seeks information concerning swimming baths. I have conducted an inquiry into the construction and working of such establishments throughout the country, and have personally inspected a large number. The information obtained has been tabulated, and includes the opinions on various points of superintendents, proprietors, &c., of baths. If your correspondent cares to give me a call or write, I shall be happy to assist him with any information on the subject which I possess.—CHARLES H. ROSHER, 5, Westminster Chambers, Victoria-street, S.W.

[9834.]—**Wind Force on Wall.**—The total weight of wall is first found by taking a foot in length by its height (10ft.), and its weight per cubic foot (108lb.), multiplying them together, which equals 1,080lb. Then the total wind pressure against this strip of wall surface (10sq.ft.) multiplied by half the height of wall (5ft.) should equal 1,260 multiplied into half the thickness of wall or the moment of weight of wall acting to resist the force. This product = 735, i.e. a fifth of this gives 147lb., the total pressure, a tenth of which— $\frac{147}{10}$  = 14.7lb. per square foot.—G. H. G.

[9836.]—**What is a Building Story?**—There is no rule as to the height of a story; but the case described by "Fairairn" may be fairly called a three-story building, although to contravene the conditions of sale the builder made his two-story back equal in height to his three-story front.—G. H. G.

[9836.]—**What is a Building Story?**—According to the Metropolitan Building Act, every floor is a story. Thus a house having basement, ground-floor, first and second floors, would be a building of four stories in height. In the case mentioned, unless the height of the stories was defined, I fail to see what action can be taken, as the builder could make the stories each 20ft. if he made the inclosing walls of sufficient thickness.—H. L.

[9837.]—**What is a Billion?**—According to the English system, a billion is a million millions; but according to the French system it is only a thousand millions. It is this fact which causes the authorities to differ.—ARTHUR LEE, Bristol.

[9837.]—**What is a Billion?**—A billion being expressed by 13 figures, or rather by the figure 1 followed by twelve cyphers, and as seven of these are required for a million, there are six left, representing one hundred thousand. It therefore seems to me correct to say that a billion consists of "one hundred thousand millions"— $\frac{1 \text{ million}}{100,000}$  = 10,000.—H. H.

[9838.]—**Building Act and Steam Pipes.**—If "R.W." will take "low pressure" to mean no pressure instead of "some pressure," which I think his conscience might allow him, he will not find that my attempt to reduce a section of the Building Act and its Amendment into one paragraph is a "direct contradiction" and "misleading." The term "low pressure" as distinguished from "high pressure" (although no definition of either is given in the Acts) is generally understood to imply that the water or steam simply circulates through the pipes and is not confined, so that the temperature of the pipes does not much exceed 212°, and would not therefore cause the ignition of any combustible material in its vicinity. As the work mentioned was intended to be as practical, clear, and concise as possible, I omitted as far as I could any unnecessary repetition and verbiage, but if "R.W." likes to alter the words "under pressure" in his copy to "above low pressure," he is welcome to do so, but I don't think much good would be done.—E. M.

[9838.]—**Building Act—Steam Pipes.**—The Building Act 18 and 19 Victoria, cap. 122, sec. 1, was modified by 45 Victoria, cap. 14, sec. 16; so that the clause in the former Act is altered by the words—"with respect to the distance at which pipes for conveying hot water or steam may be placed from any combustible materials shall not apply in the case of pipes for conveying hot water or steam at low pressure." The district surveyor will in all cases decide what is meant by "low pressure."—H. LOVEGROVE.

[9840.]—**Appraiser's License.**—As a similar question has appeared on several occasions, I must conclude that the answers in this column are not studied as they should be. I answer "Dilemma," that a surveyor who values property for mortgage or purchase need not take out a license of any kind.—H. L.

[9841.]—**Fireproof Partitions.**—I would suggest that silicate cotton be used in the construction of the partitions as described. I have witnessed a test made by Mr. W. H. Stanger, C.E., of Broadway, Westminster, at Messrs. Middleton and Co.'s, Southwark, in which it was most conclusively demonstrated that whereas the combination of either iron and concrete, or iron and terra-cotta, rapidly yielded to the influence of heat, silicate cotton and iron was, to all intents and purposes, fireproof, it having been found impossible to affect it in the slightest after being subjected to the extreme heat of a blast furnace for seven hours. No doubt Mr. Stanger will give any details required with reference to the experiments made, or the proprietors, Messrs. Frederick Jones and Co., of Kentish Town, any information with reference to the material and application thereof.—PAUL LAMBERTS.

[9841.]—**Fireproof Partitions.**—Iron joists fixed vertically, filled in with slag wool or asbestos, would be lighter; but a light partition can be made of angle-iron or light joists covered on each side with wire netting plastered.—G. H. G.

Mr. Cornelius John Durham, who only two years since was appointed as head-master of the Art Department at Bradford Technical College, on the death of Mr. Walter Smith, died on Friday last at his residence in Bradford.

### LEGAL INTELLIGENCE.

VENABLES AND OTHERS V. FITT AND OTHERS.—(Before Mr. Justice Denman and a Special Jury, Nov. 23.)—In this case a firm of land agents and surveyors, carrying on business in Chancery-lane, sued the proprietors and publishers of the *North Middlesex Chronicle* for libel. The defendants pleaded that the alleged libel was a report of certain proceedings at a public meeting, and therefore privileged. Mr. Addison, in opening the case for the plaintiffs, said the libel was contained in a report published in the defendants' newspaper in April last of the proceedings at a meeting of the Hornsey Vestry relating to a building scheme connected with the Roger Draper Trust for apprenticing poor boys in Islington. The plaintiffs' firm had long acted as surveyors for the Trust, and the words complained of occurred in the speeches of persons at the meeting. They imputed to the plaintiffs that they had acted as surveyors both for the trustees and for the builders. The defendants did not insert any apology. A member of the plaintiffs' firm positively denied that they acted for both parties. Mr. Justice Denman directed the jury to find—(1) whether the publication was a report of the proceedings of a meeting lawfully convened for a lawful purpose; (2) was it a meeting open to the public? (3) was the report fair and accurate? (4) was the publication of the matter complained of for the public benefit? The last question, his lordship said, was the only one as to which there was much interest, and was the most important. The jury answered all the questions in the affirmative, and judgment was therefore entered for the defendants.

CHEAP JACK'S PLATFORM AND THE BUILDING ACT.—Robert Owen, a travelling auctioneer, of Manchester, appeared at Lambeth Police-court on Friday to an adjourned summons, taken out by Mr. Henry Jarvis, District Surveyor of Camberwell, for having erected and kept up, or caused to be erected, a movable or temporary structure without obtaining a license from the Metropolitan Board of Works. The structure was erected on land situate in High-street, Peckham, and consisted of a platform 26ft. long by 7ft. 6in. wide, with wood covering and inclosure, supported on eighteen posts, 3ft. 9in. high, resting on the ground. Part of the structure was temporarily attached to a van at the rear, in which goods were stored that were sold by auction. In defence it was argued that the structure formed part of the van, and could be easily moved, and that such structure was exempt from the operations of the Act. Mr. Biron said he had been to the place and seen the erection. He was satisfied that it was a structure coming within the meaning of the Act. The defendant, therefore, was liable, and he must pay a fine of 20s., and £2 2s. costs.

THE ALLEGED BUILDING FRAUDS AT BIRMINGHAM.—At the Birmingham Police-court on Friday Edward Cullen was brought up on remand to answer a number of charges of fraud. The case was fully reported in our last issue (page 697), and the prisoner was now committed for trial on specific charges of defrauding Mr. Hall (architect), Mr. Clulee (landowner), and Mr. Ryland (builder).

CLARKE V. THE HANWELL LOCAL BOARD.—(Queen's Bench Division, Nov. 24. Before Mr. Justice Denman without a jury.)—This was an action by the plaintiff, an engineer, for work done in connection with a scheme of drainage. The liability was incurred by the rural sanitary authority of Brentford. The defendant board was formed out of that rural sanitary authority, and the consequence was that they had no money in hand to meet the claim, and it would be necessary to issue a special rate for the payment of any claim. After the case had been opened, a settlement was arrived at that the defendants agreed to pay the plaintiff £500, to include costs, and it was arranged that the learned judge should grant a *mandamus* to the defendant board to issue a special rate for the payment thereof.

### WATER SUPPLY AND SANITARY MATTERS.

VYRWY SUPPLY FOR LIVERPOOL.—The valves upon the discharge pipes passing through the masonry dam at the new Liverpool waterworks at Vyrwy were closed on Wednesday, and the whole of the water passing down the valley, except the compensation water for the rivers Vyrwy and Severn, has commenced to be impounded. It is expected that, owing to the late heavy rainfall and consequently great flow, the formation of the lake will be very rapid; indeed, the water already stands behind the masonry dam for a distance of about two miles.

The local board of Tattenhall, Staffs., have adopted a sewerage scheme for the parish prepared by Messrs. J. and E. B. Marten.



## Our Office Table.

At the examinations of plumbers for Registration on Saturday at the Guilds Institute, applicants were present from various parts of London as well as from towns in Kent and Essex. The examinations embraced tests of joint-making, lead-laying, &c., and a set of questions relating to the qualities of materials, the construction of various forms of house fittings, and the principles of sanitation. The examiners were Messrs. C. Hudson, C. T. Millis, J. C. Ashdown, G. Davis, and L. F. Gilbert, the last representing the United Operative Plumbers' Association. One-third only of the applicants succeeded in passing.

MR. W. JOY HEWETSON, for over twelve years the energetic and able clerk to the Swinton and Pendlebury Local Board, having been appointed clerk of the newly-formed Wood Green Local Board for an important residential district of North London, has resigned. There were 125 applicants for the post, for which Mr. Hewetson was most highly and influentially recommended. He received some years' legal training with a solicitor in Cambridgeshire, and was the founder of the Association of Local Boards and the first hon. sec., also of the Association of Local Board Clerks, of which he was the first president. Mr. Hewetson has throughout his public career taken the liveliest interest in all matters relating to public health, and has been closely identified with many important questions relating to local self-government. Such men are badly wanted in London.

An important addition has been made to the treasures of the Ashmolean Museum at Oxford by the liberality of Mr. C. D. E. Fortnum, who has made over as a gift to the University the collection of works of art which he had previously deposited in that museum as a loan. The collection ranges from the Classical period of Greek art to the period of the Renaissance; it contains many altogether unique objects, and, in the Italian series especially, can hardly, in the opinion of the keeper of the museum, Mr. Evans, be matched outside a national museum.

A FIRE-RESISTING paint is described by an American writer, Mr. Edward Hurst Brown, who witnessed a test. A small shanty with flat roof, built of inch boards, was coated with two coats of Vulcan paint, which is prepared in any colour. The rough interior had two coats of "soteria," a solution like whitewash. After shavings were piled against the back of shanty, and on the roof, the whole soaked with coal-tar, it was set on fire. After a few minutes' very hot blaze, the shanty was as good as ever. Sawdust was then placed in barrels and piled up inside, with fresh fuel against the back of shanty. Coal-tar was poured over, and the mass set on fire. After twenty-three minutes' of intense heat, the back of the shanty began to burn very slowly and feebly. The test proved, so the writer says, that Vulcan paint and soteria render woodwork fire-resisting or slow burning, and suggests their use to protect timber railway bridges, sheds, and other wooden erections. They should not be used on metals, as their chemicals act as powerful corrosive agents.

In the BUILDING NEWS for April 11th, 18th, 25th, May 2nd, 16th, 23rd, 1884, we published Mr. T. Purves Marwick's, R.I.B.A., prize essay on staircases, with illustrations. The author has now somewhat developed his able and comprehensive treatise with further illustrations, and has published it in a useful handbook form for the desk and library. In this shape many readers will be glad to obtain the reprint for ready reference, though the plates have been necessarily reduced as compared with our own reproductions of them. Messrs. J. and J. Gray, of Edinburgh, are the publishers. The volume is nicely got up and printed.

Two new blocks have been added to the Lewin's Mead Brewery at Bristol, and have just been completed. They are of red and yellow brickwork, and are from the designs of Mr. W. B. Gingell, of that city, who is also the architect for the rebuilding of the Crown and Dove Tavern in Bridewell, on an enlarged scale, for the owner of the brewery. Messrs. Brook and Son, of Bristol, are the contractors for all the works.

## MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institution: Monthly general meeting. 5 p.m.  
Royal Institute of British Architects. "The Control of Building Operations in Paris," by F. Hooper. 8 p.m.  
Society of Arts. "Light and Colour," Cantor Lecture No. 2, by Capt. W. de W. Abney, C.B., F.R.S. 8 p.m.  
Society of Engineers. "High-Pressure Steam and Steam-Engine Efficiency," by W. W. Beaumont. 7.30 p.m.  
Clerks of Works Association. "Carpentry," by G. Dalton. 8 p.m.  
TUESDAY.—Institution of Civil Engineers. "The Influence of Chemical Composition on the Strength of Bessemer Steel Tires," by J. O. Arnold. 8 p.m.  
Birmingham Architectural Association. "Edington Church, Wilts," by C. E. Ponting, F.S.A.  
Glasgow Architectural Association. "Jedburgh Abbey," by William Fraser.  
Manchester Architectural Association. 7.30 p.m.  
WEDNESDAY.—Society of Arts. "The Graphophone," by H. Edmunds. 8 p.m.

## CHIPS.

£700 towards the £1,200 required for the statue of William of Orange, proposed to be erected at Brixham, has been subscribed, and the Bicentenary Commemorative Committee have now under consideration designs and models for the statue submitted by Prince Victor of Hohenlohe-Langenburg, Mr. Harry Hems, of Exeter, and Mr. Wills, of London.

Large additions are being made to St. Paul's Institute, Burton-on-Trent. These are being carried out at the expense of Lord Burton, from plans prepared by Mr. Churchill, the contractors being Messrs. Lowe and Sons. The chief addition is a room 63ft. by 24ft., and 20ft. high. It has a panelled dado of pitch-pine stained dark walnut, while a block floor has been laid by Messrs. Homan and Rodgers, of Manchester, who have also laid a new floor in the large hall. Other improvements have been effected, the total cost reaching £1,650.

The new Salem Congregational Chapel at Manningham, Bradford, was opened on Friday. The chapel will afford accommodation for 500 persons in the area, and for 240 in the galleries. The furnishing is in pitch-pine. The style of architecture is Geometrical Gothic of an Early type; the tower and spire, as well as the schools, will have to be erected at some future time. Mr. James Ledingham is the architect. The chapel was illustrated by a double-page perspective and plan in the BUILDING NEWS for Dec. 9, 1887.

As a result of a meeting held in the Technical School of Belfast, it has been decided to form a district council to carry on, in conjunction with the Plumbers' Company, the work of registration.

A new Conservative Club at Rushden, erected at a cost of £500, from plans by Messrs. W. Talbot Brown and Fisher, has been opened by Lord Burghley, M.P.

The Nonpanton Mission-room, Loughborough, is warmed and ventilated by means of Shorland's patent Manchester stove, supplied by Mr. E. H. Shorland, of Manchester and London, Mr. A. A. Burder, of Loughborough, being the architect.

The fund for the erection of a monument at Brussels to the British officers and men killed or mortally wounded at Waterloo, and buried in the city cemetery, is now closed, and Count Lalain, the well-known Belgian sculptor, has been commissioned to proceed with the execution of the work.

The rebuilding for the most part of Shobrooke church tower, near Crediton, has been completed: Mr. Berry, of Crediton, was the builder; and Mr. Ashworth, the architect. The bells have been rehung and one recast by Mr. Stokes, of Woodbury. The outlay is about £500. The body of the church was enlarged and restored about eight years since by the same builder and architect.

A new organ in the Roman Catholic Pro-Cathedral at Clifton, Bristol, was opened on Sunday. It replaces an instrument built fifty years since, and has been built by Messrs. Vowles and Son, of Bristol.

The Royal Society of Painters in Water Colours, at its meeting this (Friday) evening, is likely to be called upon to proceed to the election of a new president, the resignation of Sir John Gilbert having already been proffered on more than one occasion.

The work of re-erecting Temple Bar at the entrance to Theobalds, Waltham Cross, is now complete. The old Bar forms an entrance to Sir Henry B. Meux's private grounds, and is close to the public highway.

An improvement is about to be effected in the neighbourhood of the market at Leeds by the erection of seven shops on a vacant plot of land in York-street. The block is about to be built by Mr. John Hepper, from designs by Messrs. Smith and Tweedale, South Parade.

The Court of Aldermen on Tuesday accepted the resignation of Mr. Alderman J. E. Saunders and requested the Lord Mayor to issue his precept for the election of a successor.

A bust of the late Mr. John Wilson, LL.D. formerly Professor of Agriculture and Secretary of Senatus in Edinburgh University, executed in white marble by Mr. F. J. Williamson, of Esher, has just been presented to the university by his widow.

Mr. H. E. Cleaver, of Cleaver-street, Kennington-cross, sends us proof copies of two original etchings by Mr. Edgar W. Wilson, published this week. One is of Lambeth Palace, and the other John Bunyan's Mission House, Lambeth. Both are fairly good, and will be appreciated by more than local admirers.

Messrs. Mudey, Carvey, and Co., of Newport, Mon., have just accepted a tender for the construction of their new dry dock at that port, the cost of which will be nearly £20,000.

The committee for the erection of the Edinburgh free library have this week had under consideration the question of artificial lighting for the building now in progress. Sir William Thomson was consulted, and he has, after consultation with Mr. Geo. Washington Browne, the architect, and Mr. Bryson, the engineer, recommended that, considering the largeness of some of the spaces to be lighted and the smallness of others, the best plan to adopt was a combined system of arc and incandescent lights. The committee have adopted the suggestion, and are now asking for tenders for the work.

Mr. George Hodson, Mem. Inst. C.E., of Loughborough, has been called in by the Visiting Committee to report to them upon the water supply for the Suffolk County Asylum at Melton.

Chilton Polden church, near Bridgewater, is undergoing restoration and enlargement. The contractors are Messrs. F. Merriek and Son, of Glastonbury, and the architect is Mr. E. Henry Edwards, of Bristol and Weston-super-Mare, under whose direction the work is being executed.

The Lord Chancellor attended at the Royal Courts of Justice on Wednesday to unveil a marble bust of the late Sir George Jessel, Master of the Rolls from 1873 to 1883. The bust has been executed by Mr. Walter R. Ingram, and represents the late Master of the Rolls in full-bottomed wig and robes. It has been placed close to one of the columns outside the Lord Chief Justice's Court.

The Bishop of London opened on Wednesday a group of buildings situate in the disused burial-ground on the northern side of Paddington-street as a public mortuary and coroner's court. The buildings are arranged in three distinct blocks, separated by paved roadways. On the south side is the public mortuary, the walls being lined with light glazed tiling their whole height. The floor is also tiled, and the windows are filled with tinted glass. The eastern end is divided off by a pointed archway available for use as a mortuary chapel. The north side contains in one block a post-mortem room, coffin store, and inquest mortuary, the principal feature of which is its separation by a large glazed partition for jurors viewing bodies. Messrs. H. Saxon Snell and Son are the architects, and Messrs. Wall Brothers, whose contract amounted to £3,131, were the builders.

The new mission hall in connection with the church of St. James's, Hatcham, in Knoyle-street, Woodpecker-road, Hatcham, was opened on Wednesday week. The style is Early French, and the interior dimensions 73ft. by 40ft., with a large classroom, used as a chancel, at the east end, 20ft. by 16ft. It is built with stock brick and red brick dressings, and will seat 500 worshippers. The cost, including heating, seating, and boundary walls, is £1,896. Messrs. Newman and Newman were the architects, and Messrs. Balaam Bros., of Old Kent-road, builders.

The memorial-stone of the new Grand Theatre and Opera House, North Bridge, Halifax, was laid on Tuesday. The architect is Mr. Frank Matcham of London, and Mr. Geo. Charnock the contractor.

The convocation of Oxford University has decided to continue the grant of £100 per annum to the British School of Archaeology at Athens for three years. Mr. Robinson reported that the school was actively pursuing its work at Athens, that it had buildings and a library, and that among its more notable operations was the successful conduct of explorations in Cyprus.

Two brass standards of between 30 and 40 lights each, designed by the late Mr. T. Gambier Parry, have just been presented to Gloucester Cathedral.



# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1770.

FRIDAY, DECEMBER 7, 1888.

## THE EMPLOYMENT OF ARCHITECTS.

AN increasingly large percentage of the buildings that are now erected are put up without architectural assistance. In a flourishing suburb of Brighton it has been asserted that of the yearly expenditure on houses scarcely one per cent. of them has been designed by architects. In the metropolis it can hardly be said that even this proportion of professional assistance is obtained in the case of house-building. Whole estates are now built upon plans that have been prepared by speculative builders and even estate agents. Till within recent years some excuse for the non-employment of architects could be found. They had neglected sanitary precautions, and were unwilling to keep pace with improvements of various kinds; but it cannot be now said that apathy or incompetence on those matters are prevalent.

Practical architecture has advanced by leaps and bounds of late years. Technical questions have been forced upon the attention of architects, the system of education has been more thorough, and examinations have compelled the acquirement of various branches of science. There can be little or no ground for building owners to say that competent and practical architects are not to be found. In every town able practitioners are to be met with. What reason, then, can be urged? The great competition existing—the large demand for cheap houses, is the really assignable cause. The increase of cost in building materials and heavy ground-rent have left no margin for the architect's commission. The leasehold tenure is not favourable to good architecture, any more than it is to substantial buildings. Ample proof of this proposition can be found on every leasehold estate where a whole row of houses are built from one design. Multiplicity of production and cheapness are inseparable. The principle of repetition is unfortunately creeping into architecture as it has done in the manufactures, and, of course, this means a saving in cost. A large number of buildings are now copied, the plans are adopted by one owner from another, the architect is dispensed with, for it is easy to get a builder to undertake the erection of any design at a short notice. Churches, chapels, schools, workshops, and houses of business are reproduced with more or less nicety by those who undertake the building. Architects make a stand against the system, but so long as the preparation of designs means much expense, we cannot be surprised if the public follow suit. Hybrid features do not affect Mr. Busman's sense of the fitness of things so long as he is the latest manufacturer in tile pavements, electric bells and alarms, electric lighting, and sanitary appliances to show for much capital expended on his business premises. He looks only to practical results. The builder can supply him without the formalities of professional routine. The contractor for the supply of materials and goods is not the individual to raise any objection to such transactions. He is likely to prefer the non-intervention of an architect, if he can supply his goods at a fair profit. Why should he not? He manufactures to sell. The architect is more critical and exacting. He is anxious that his own designs should be carried out, and these, we know, often entail expense on the client. An addition of so much per cent.

is necessary—say 10 to 20 per cent.—upon the manufactured goods, which the builder can save. Why should we employ an architect if all that we want can be obtained at a less price, is the question put by the majority of those who are thinking of building. It is of little value discussing topics of abstract art with those who look upon building simply as a necessary evil and expense; far better that the architect should endeavour to make clear his claims. Let him show that to vary is to adapt. A mechanical repetition of the same plan has never given satisfaction either in house building or business premises. The public are a long time learning why the same design should not be used in two or, if need be, a dozen different places, and as long as they look upon architecture as nothing better than the art of making boxes or brushes or any other useful article, they will never see the use of paying an architect's fee.

In many of the principal towns we have a local machinery that to a certain extent diminishes the architect's employment. Local authorities require the deposit of plans of every building about to be erected in their jurisdiction. Intending builders are aware of the requirements, and, to save delay and trouble, have their designs prepared by the local surveyor, or by some official or builder who knows the "ins" and "outs" of the committee appointed to deal with plans. We do not say anything here about the right or wrong of such a proceeding, as any individual has his own option; nor do we here refer to the avowed objection raised to the deposit of plans by some architects, who plead that, as plans they are their private property, and they are not justified in submitting them to an official and thus making them public. Say they, their ideas become quickly appropriated without any compensation being made. These objections cannot be fully sustained now, while the architect floods the market with his own designs. Moreover, it has been pointed out that by refusing to submit plans to the authorities, architects are limiting their own employment.

We do not endorse, of course, all the vagaries committed by our local urban authorities in their demands; but the municipal regulations and the by-laws in force have become a very important branch of the architect's duty, and the better he is acquainted with them and embodies them in his designs, the more will he be able to compete against the agent or builder who, by making himself expert in the red-tape routine, manages to secure legitimate architect's work. When there is a general building law for the whole country, the market will be less open to those who now set up as contracting builders or agents, and guarantee the passing of any plans with which they may be intrusted. Expedition and sharpness, upon which these sort of practitioners depend, are the very soul of business. The young architect has not learned to comply with the by-laws, he is inclined to kick against them, trying to make some improvement here or there; in the mean time his client gets impatient at the slow progress made, at the objections raised by the authorities to the design. Sanitary regulations are irksome, too. An entire design fails to pass, or the building delayed because of some trifling detail of the drainage not having been attended to. The cost of building under an architect has been somewhat increased by the usual practice of providing quantities by which a commission equal to half that of the architect's has been added to the expense incurred even before a brick has been laid. The value of the quantities to the owner is not apparent to him, nor will it be till architects take more interest in their preparation, or have placed them on the same footing as the specification.

## LAND SURVEYING.—XIV.

LOGARITHMIC TABLES — DETAILS.

WE now take up a few details in surveying that may be of service to the student. In performing calculations the use of mathematical tables is necessary. We have incidentally alluded to tables of natural sines, cosines, and tangents, and their value in computing triangles. These tables are generally expressible in degrees and minutes of angles, so that we may have an angle which is not exactly found in the tables. To take an example, let us suppose the angle we require the sine of is  $20^{\circ} 14' 20''$ . The table gives us  $\sin. 20^{\circ} 14' = .3458441$ , and  $\sin. 20^{\circ} 15' = .3461171$ . The angle we require is between these two, and to find the exact measure we have to add a quantity to the first decimal. Let  $x$  denote this quantity; then we proceed as follows:—

$$\text{As } .3461171 - .3458441 = .0002730,$$

we make a proportion, thus:

$$\text{As } 60' : 20'' :: .0002730 : x.$$

Therefore

$$x = \frac{20}{60} \times .0002730 = .0000910.$$

Adding, therefore, to the decimal .3458441 this value of  $x$ , we get .3459351, which is the sine of  $20^{\circ} 14' 20''$ . By the aid of tables of logarithms calculation is much abbreviated.

Taking the same angles—

$$\text{Log. sin. } 20^{\circ} 14' = 9.5388804$$

$$,, \sin. 20^{\circ} 15' = 9.5392230$$

$$\text{Diff. for } 60' = .0003426$$

and since the necessary L sin. lies between those above, we have by proportion—

$$60 : 20 :: .0003426 : x.$$

Therefore—

$$x = \frac{20}{60} \times .0003426 = .0001142 \therefore \text{L sin. } 20^{\circ} 14' 20'' = 9.5388804 + .0001142 = 9.5389946.$$

Another example. Let it be required to find the tabular logarithmic sine of the angle  $32^{\circ} 18' 24'' .6$ . Now—

$$\text{log. sin. } 32^{\circ} 18' 20'' = 9.7278943$$

$$\text{L. sin. } 32^{\circ} 18' 30'' = 9.7279276$$

$$\text{Diff. for } 10'' = .0000333$$

and since the required log. sin. lies between these two, we have the proportion—

$$10'' : 4'' .6 :: .0000333 = .0000153.$$

Therefore—

$$\text{L. sin. } 32^{\circ} 18' 24'' .6 = 9.7278943 + .0000153 = 9.7279096$$

For further information as to the theory of logarithms generally and the use of tables, we refer the student to Todhunter's "Trigonometry," or to any treatise on the subject. Tables of the logarithmic sines are found in many handbooks.

In observing with the theodolite it is necessary to read both the verniers. After reading one of them in degrees, minutes, and seconds, read the minutes and seconds of the other, and take the mean of the two readings. Release the upper plate, and direct the telescope to the second of the objects and clamp it as before, making the cross wires bisect it. Read again the two verniers, and take the mean of the readings. To do this we subtract the one mean from the other, and the angle found will be the desired angle. Thus, if the angle read off by one vernier be  $120^{\circ} 38' 20''$ , and by the other  $37^{\circ} 50''$ , we put them down thus—

$$\begin{array}{r} \text{By one vernier } 120^{\circ} 38' 20'' \\ \text{By other } 37^{\circ} 50'' \end{array}$$

$$2) \quad 241 \quad 16 \quad 10$$

$$\text{Mean} = 120 \quad 38 \quad 5$$

The other readings to the second object are similarly dealt with, and, say the mean is  $75^{\circ} 45' 3''$ , then—

$$\begin{array}{r} 120^{\circ} 38' 5'' \\ \text{Subtract } 75^{\circ} 45' 3'' \end{array}$$

$$\text{Correct angular distance } 44 \quad 53 \quad 2$$

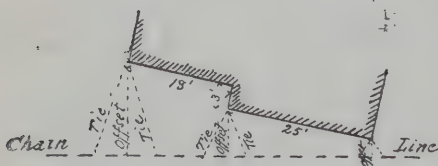


We have referred to the necessity of reducing all distances to the horizontal. We can imagine a field of considerable rise or contour in section having a crop of wheat. It would not be correct to measure the surface, for every plant grows vertically, so that there would not be more plants on the contoured surface than upon the horizontal. The same reasoning applies to trees and all vegetation. A drain cut along a trench to the contour of surface would, on the other hand, be longer than one on the horizontal, and therefore the principle does not apply. In fencing, the vertical posts would be the same on the surface as on the horizontal, but the rails could be necessarily longer, as they would have to follow the curved line of surface. The clinometer is generally used to take the vertical angles of the slopes, as we have explained in a previous article. Every chained distance along the surface of a slope becomes the hypotenuse of a right angled triangle, so that it only becomes necessary to measure the angle of inclination, and the horizontal distance can be easily calculated by referring to a table giving the angle in one column and the number of links to be subtracted from every chain. Thus, a slope of  $8^{\circ} 30'$  has a reduction according to table of 1.10 links. Hence, a line measuring 12 chains is multiplied by this reduction, and the product subtracted from the distance chained gives the true distance. Thus,  $12 \times 1.10 = 13.20$ ; and  $1200 - 13.2 = 1187$  horizontal distance, or 1,187 links. In the operation of chaining in the field, a sectional sketch may be made, showing the distance chained on each slope, and the angle of depression or acclivity noted on the line of slope. The calculations are made at leisure by the aid of a table of cosines, or by a table of reductions, as we have noticed.

In taking offsets to buildings it is a good check to take a tie to each as in the figure (No. 23), by which means the accuracy of the off-set is insured, especially if it be a long one, and it is also necessary to take the distances between them, so that they may be

Fig. 23.

Method of Taking Offsets.



fixed not only on the chain line, but on the building which has to be plotted. Wherever details of towns have to be filled up the importance of this practice cannot be too strongly enforced, as rough off-sets of great length and not of very correct perpendicularity are likely to lead to very inaccurate results.

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XXII.

By HENRY LOVEGROVE, F.S.I., Surveyor.

COMPLETION OF SPECIFICATION FOR THE ISOLATION HOSPITAL.

22. **TILE PAVING.**—The floors of verandah to be paved with 6in. red Staffordshire tiles bedded and jointed in cement on cement ground.
23. **Glazed Bricks.**—The wards on ground floor to have dado as shown, of Cliff and Son's glazed bricks, set and pointed in cement, the tints to be approved, and the lower part to a height of 9in. forming skirting, to be of a different tint from the upper part. Turn arches when required, perform all cuttings, form rounded

external angles and circular internal angles. The dado to be finished with a moulded capping 3in. high, and 3in. projection, set and pointed in cement.

### TERRACOTTA.

24. **Dressings.**—The plinths, strings, copings, corbels, openings, apex, stones, gables, and all external dressings, to be of the best red terracotta, to be supplied by Mr. J. C. Edwards, of Ruabon, to be carefully moulded in accordance with the detail drawings, and truly set in fine mortar.

### PATENT CONCRETE.

25. **Stairs.**—The landing of stairs to be of patent concrete, 6in. thick, the steps to be 12in. by 6in. square; winders 6in. thick.

### YORKSHIRE STONE.

26. **Templates.**—Provide the necessary templates for the ends of all bearing timbers except those to arcade, which are to be of terracotta. The girders to have a 2in. self-faced cover stone coped to width.
27. **Steps.**—The thresholds to be 3in. thick, rubbed and back-jointed both edges. The steps to be rubbed and to be solid, as shown.
28. **Chimney-pieces.**—The shelves to be 12in. by 3in., cut and pinned into wall with moulded front edge, and returns to form chimney-piece in glazed brick facings, and make good. Each shelf to have brackets 4in. by 9in. by 6in., moulded and carved on front, cut and pinned into wall.
29. **Hearths.**—The hearths to be of glazed tiles P.C. 10s. per yard, bedded and jointed in cement, on a cement ground.
30. **Fenders.**—The fenders to be of glazed stoneware.
31. **Roofs.**—The roofs to be covered with best Brosely strawberry-coloured tiles laid to a 3in. gauge, and securely fixed with composition nails. The tiles to be neatly cut against walls, the eaves-courses to be double in cement, and verges to be neatly pointed in cement, with a cement fillet.
32. **Ridge.**—The ridge and hip tiles to be of an approved pattern, 1s. 6d. per foot, run P.C., bedded and pointed in cement. The valley and hip tiles to be made to suit the rake of roofs.
33. **Vertical.**—The plain and ornamental tiling to be carefully executed.

### CARPENTER.

All the fir timber to be sound, dry, well-seasoned, free from sap, shakes, large, loose or dead knots, and other defects to be sawn die square, and to hold the full scantlings figured or described herein when fixed.

**Roofs.**—The roofs to be framed as shown, the rafters and principal rafters in one length, notched and spiked to plate. Trim for chimney shafts, ventilators, and dormers. The timbers to be of the following scantlings:—Rafters  $4\frac{1}{2}$  by  $2\frac{1}{2}$ , collars 5 by 2, wall-plates  $4\frac{1}{2}$  by 3, purlins 6 by 4, ridge 9 by 2, hips and valleys 9 by 3. The trusses over large wards to have rafters 6 by 4, with cast-iron shoes and king head  $1\frac{1}{2}$  dia. Wrought iron king and tie rod hereafter described in Smith. The timbers showing below plaster ceiling to be wrought. Fir cleats on back of principals to be out of 6in. by 4in. by 9in. spiked on. The ends of rafters, hips, and valleys to be wrought and cut. 6in. by 1in. wrought and beaded eaves fascia. Provide and fix deal tilting fillets where necessary. Trimming ceiling joists of large wards for three ventilating panels, 3ft. square, and fix therein perforated zinc panel, with 3 by 1 wrought and chamfered fillet mitred round same.

**Verandah Roofs.**—Fill in the ends of verandahs with 4 by 3 heads, sills, uprights, and 4 by 2 quarters, all properly framed together. Cover outside with tiling and battening inside with 1in. wrought one side tongued and beaded boarding, 1in. wrought, one fascia fitted in between rafters over arcing, and 4 by 1

wrought filling piece at back. Form ceilings of verandahs with 1in. wrought boarding, as before described; 6in. by 1in. wrought fascia plugged to wall, with small moulding on face of same under ceiling boarding.

**Arading.**—The arading to be oak wrot., and framework with 6 by 6 posts dowelled with iron to terracotta bases; 6 by 3 wall pieces and 3in. framed circular heads, pinned with oak pins. Provide three pieces of hoop-iron, and fix to each post, and build into half-brick walls to secure same.

**W.C. Roof at Back.**—To have 9 by 2 deal wrought framed barge-board, with wrought out ends, and deal moulding out of 3 by 2 planted on face.

**Dormers.**—The dormers to 6 by  $4\frac{1}{2}$ , wrought and framed fronts;  $4\frac{1}{2}$  by 4 head; 9 by  $4\frac{1}{2}$  wrought, framed, rebated and moulded both edges upper transom or head; 7 by  $4\frac{1}{2}$  double rebated transom, moulded front edge  $4\frac{1}{2}$  by  $4\frac{1}{2}$ , double rebated and beaded mullion 7 by 4, oak sill sunk, weathered, rebated, beaded, grooved, and moulded on front edge. Fill in above transom with wrought-iron casement and frame on centres with Elsley's patent casement-opener fixed with deal mitred bead, secured to frame with brass cups and screws. The lower part of dormer to be filled in with 2in. moulded casements in small squares hung on butts brass lever casement fastener and brass lever stay,  $1\frac{1}{4}$  wrought tongued window board and bearers with rounded nosing 1in. wrought one side fascia over window; lin. close-jointed boarding to cheeks of dormer, fixed to 4 by 3 heads, sills, &c.; 4 by 2 quarters. The dormer cutting into roof of verandahs to have flat and sides to same of lin. close jointed boarding and timbers, as above described. The smaller dormers to be similarly constructed as above described and with 9 by 2 wrought and frame barge-board, with 2 by 1 moulding planted on face of same. 1in. gutte boards and bearers, 2in. rebated drips and 2in. rounded rolls.

**Roof Boarding, &c.**—The roofs to be covered with  $\frac{1}{2}$  deal boarding and inodorou roofing felt; 2 by  $\frac{1}{2}$  sawn battening to vertical tiling.

**Floor Timbers.**—The joists to be 9in. by 2in with trimmers 1in. thicker, all properly framed and notched to  $4\frac{1}{2}$ in. by 3in. wall plate, 2 by 2 herring-bone struttin between joists.

**Wood-Block Flooring.**—The rooms and ward to ground floor, unless otherwise described, to have approved wood-block flooring laid and grouted with cement on concrete bed, 6in. thick, levelled to receive same.

**Partitions, &c.**—Frame the partitions with 4 by heads, sills, interties, and braces, 4 by quarters.

### JOINER AND IRONMONGER.

**Materials.**—The materials used for joiner work to be of the best description thoroughly well seasoned.

**Floors.**—The flooring to upper rooms to be 1 wrought pitch-pine 3in. widths, laid with splayed heading joints and mitre borders to hearths.

**Windows.**—Casement to dormers described with dormers previously. The windows to have 4in. by 3in. fir, wrought frame rebated, beaded, and grooved frame 4in. by 3in. wrought framed, double rebated, and beaded mullions and transom 4in. by 3in. oak, wrought framed, sun-weathered twice, grooved and rebated sill galvanised iron water bar bedded in white lead between oak and terracotta sill. Fill in above transome wrought iron frame and casement in small square hung at bottom to open as hopper, with Elsley's patent opening apparatus. The casement below transom to be 2in. deal moulded in small squares with wide sash bars, hung with 3in. butts, brass lever casement fasteners and lever stays. 1 deal wrought tongued window board proper bearers, rounded nosing with notched and returned ends. The circular



windows in gables to have casements hung on centres with line pulleys, &c., to open and close same. The inspection windows to have 2in. moulded fixed sashes, and 4in. by 3in. moulded frames. Where the window frame is flush with the surface of walls, the plastering is to be stopped with a 2½in. by ¾in. deal wrought, rounded and splayed, fillet mitred and fixed to frame.

**Doors, Ground Floor.**—The doors to have 4in. by 3in. wrought framed, rebated and beaded frame fixed with iron dowels to stone; 4in. by 3in. double rebated and beaded transom where shown; 2in. moulded and flush half-glass doors, the lower part in four panels, the upper filled in with moulded wide-sash bars forming small squares, moulding out of 3in. by 2in., planted on the middle rail of door. The doors to be hung with 1½ pair 3½in. butts, 6in. mortice lock, with brass furniture. Plain brass finger plates, Norton's patent door spring to be fixed to doors, to wards, and staircase. The fanlights over doors to be wrought-iron frame, and casements hung at bottom with Elsey's patent opener, as described to windows. The doors to cupboard doors to be 1½in. three panel moulded and square, hung on butts with mortice; cupboard lock 1½in. wrought-framed, jamb linings with proper backings, 2in. by ¾in. door stop. The doors to w.c.'s and sinks to be 1½in. four panel, bead butt, and square, hung on butts, with japanned iron thumb latch, and small barrel bolt to w.c. doors.

**First Floor Doors.**—The doors to first-floor rooms to be 2in. three panel, moulded both sides, hung on butts; 6in. mortice locks, with white china furniture and finger plates, 1½in. wrought double rebated and doubled beaded jamb; linings and backings to doors, isolation lobbies, 1in. jamb linings and backings with 2in. by ¾in. door stop to other doors; 3in. by 1in. wrought framed, splayed and beaded grounds.

**Finishings to Stairs.**—Provide and fix rounded nosing to landing, 1in. wrought risers where required, 4in. by 4in. mahogany-turned newels, and 3in. by 2½in. mahogany-moulded handrail, fixed with all necessary handrail-screws, 1½in. by 1½in. deal-turned balusters to landing. The stairs between walls to have 2in. diameter; polished brass handrail each side on brass bracket, fixed securely into walls. Ornamental termination at one end, the other bent round, flanged, and fixed with screws to newels.

#### FOUNDER AND SMITH.

All the wrought and cast iron to be of the best quality.

**Cast Iron.**—The eaves gutters to be 5in. cast iron, half round, with red-lead joints and all necessary stopped ends and outlets. The down pipes to be 3in. diameter, with collars cast iron, jointed with red lead, and securely fixed to brickwork with pipe nails, with all necessary swan-neck and other bends. Provide the king heads and shoes for principals, for fixing by carpenter. Provide No. 6 of Dr. Teale's patent grates, also No. 5 mantel shams for the fireplaces, where no stone chimneypieces are described.

**Wrought Iron.**—Provide rolled iron joists as shown—one 10lb. per foot run as cantilever to support winders to stairs, and one 32lb. per foot run over bath spaces. Provide the chimney bars for bricklayer, the ends to be split and turned up. Provide and fix the tie and king rods for roofs over wards. Provide the iron frames and casements, one centres, as shown, to be fixed in wood frames of dormers. Provide and fix ¾in. wellled tubing for hot water, with all necessary elbows, bends, and T-pieces, &c., complete. No. 6 ¾ brass screw-down hot-water taps. Provide the sum of £5 for electric bells, and £10 for gas pipes and fittings, including fixing.

#### PLUMBER.

The lead to be the best milled lead, and to be fixed with all necessary wall hooks, tacks, and lead-headed nails.

All gutters and chimney-gutters to be of 6lb. lead, and flushings of 5lb. lead. The aprons to dormer-windows to be carefully dressed up to sills, and copper nailed.

The water supply to be carried out in accordance with the water company's regulations.

Provide and fix ¾in. strong lead pipe to supply cold water from the nearest point in administrative block to the sinks and baths, and ¾in. branches to water-waste preventers in w.c.'s. No. 6 brass screw-down taps to be fixed where directed.

The w.c.'s to be fitted with plain white wash-out closet, £3 16s. list price, and clean deal hinged seat in brackets, and water-waste preventers 25s., with galvanised iron chain and handle; 1½ lead flush pipe.

The baths to be hospital baths of copper on wheels, with vulcanised indiarubber tires, and washer and plug for emptying same.

The sinks to be white enamelled hospital sinks, 3ft. 6in. by 2ft., with brass grating, and fixed on proper bearers, and 2in. lead wastes.

#### GLAZIER.

All glass to be of the best quality, well puttied and back puttied.

The iron casements in ward and fanlights to be glazed with best quarry glazing in random tints, 2s. per foot super.

All doors and w.c. windows to be glazed with small-fluted plate glass, ¾ thick.

All windows, unless otherwise described, to be glazed 21oz. best sheet glass.

#### PAINTER.

All the woodwork and ironwork usually painted both inside and out to have four coats of good oil colour finished in plain tints. The ironwork to be finished purple-brown.

Internal woodwork generally to be finished white and twice varnished; all doors to be finished dark stone colour.

The cement dados and skirtings to be painted four coats.

#### A SUBURBAN STABLE.

##### TILER—DIMENSIONS.

ft. in.	ft. in.	
121 6		
3 3		
		Round ridge tiles bedded in cement to main roof and dormers.
		7. Intersection of ridge with two hips, and to dormers.
		4. Do. hip valley.
		3. Do. with hip valleys.
		3. Do. with two valleys.
		7. Cut ends to tile ridge.
2 23 11	46 6	Hips tiles securely fixed with screws, and boarded and pointed in cement.
8 0		
4 0		
2 21 9	43 6	Hips tiles as before.
5 9		
6 9		
4 6 9	27 0	Add to back dormers.
2 5 9	11 6	Add dormer to loft.
2 8 9	17 6	Add back dormer to stairs and apple store.
19 3	19 3	12. Cut ends to do.
15 0		Valley tiles and fixing.
6 6 9	40 6	Add.
5 9		Add.
2 7 9	15 6	Add.
2 8 9	17 6	Add.
6 9		
2 73 0		10. Cut ends to valley tiles.
18 4	2676 8	Deduct tile valley back dormer.
23 6		Broseley tiling in and including battening, ¾in. deal boarding, and in-odorant felt, allowance to be made for laps.
5 9	135 2	Add over groom's room.
2 20 3		
15 6	627 9	Add over dwelling rooms.
18 6		
16 6	610 6	Add over apple store.
19 6		
9 9	190 2	Add over ovals, &c.
2 124 9	249 6	Cutting and waste to tiling next ridges collected b. edges measured.
4 23 3	93 0	
2 8 9	17 6	Do. at hips, also cutting and waste on ¾in. do. bdg.
2 4 0	8 0	
4 21 9	87 0	
2 5 9	11 6	Deduct do.
2 6 9	13 6	
8 6 9	54 0	Add do.
4 5 9	23 0	Add.
4 8 9	35 0	Add.
2 19 3	38 6	Do. to valleys.
2 15 0	30 0	
12 6 9	81 0	
2 5 9	11 6	Cutting and waste tiling to valleys, also bdg. as before.
4 7 9	31 0	
4 5 9	35 0	

ft. in.	ft. in.	
6 9		Deduct do.
246 6		Double course of tiles in cement at eaves.
8 5 0	40 0	Add to back dormers, &c.
2 3 0	6 0	Add do. for stairs.
2 5 9	11 6	Add loft.
2 5 9		Deduct tiling, battening, bdg., and felt for pigeon loft.
2 5 0	67 6	
2 6 6	13 0	Cutting and waste on tiling and bdg.
4 5 0	20 0	
6 0		Deduct tiling, battening, bdg., and felt for dormer to loft.
13 6	81 0	
1 3		
2 0	2 6	Add do. extra in front.
9 0		
6 0	108 0	Add for roof of dormer.
3 6		
5 6	19 3	Deduct do.
2 8 6	17 0	Cutting and waste on tiling to side of dormer.
4 0		Deduct tiling, battening, bdg., and felt dormer to apple loft.
7 6	30 0	
2 5 3		
4 9	49 11	Add roof of dormer.
3 6		
2 6	8	
2 7 6	15 0	Cutting and waste tiling.
4 6		Deduct tiling, battening, bdg., and felt for dormer at back.
5 6	24 9	
2 5 3		
5 3	55 2	Add do. to roof.
2 5 0		
5 0	50 0	Deduct do.
4 4 6		
5 3	94 6	Add do.
2 5 6	11 0	Cutting and waste to tiling next dormer.
4 5 0	20 0	
2 5 3	10 6	Add.
7 3		
3 9	27 3	Deduct tiling, bdg., battening, and felt dormer to stairs.
2 3 3		
7 3	47 2	Add.
2 3 9	7 6	Cutting and waste to tiling.
7 3		
3 6		Deduct tiling, bdg., battening, and felt for chimneys.
3 6	36 9	
3 10 6	51 6	Cutting and waste to tiling for chimney.
		BAY WINDOW.
		Tile ridge as before to bay window.
		Tiling, battening, boarding, and felt to do.
2 4 0	64 0	Cutting and waste tile next ridge.
2 4 0	8 0	Add gable next wall.
2 8 0	16 0	Two courses of tiles in cement at eaves.
2 4 0	8 0	Pointing to verge and cement fillet to gable.
2 8 0	16 0	Add.
2 15 3	30 6	Add.
2 8 9	17 6	Add.
2 6 0	12 0	Add dormer.
2 5 6	11 0	Add do.
4 2 0	8 0	Add.
17 7		Ornamental vertical tiling, battening, and bdg., and felt to gable.
10 6	92 9	
2 13 6	27 0	Raking, cutting, and waste to tiling and bdg.
18 0		Plain vertical tiling, battening bdg., and felt.
2 1 4	2 8	Raking, cutting, and waste on tiling, and bdg.
1 5 4		Ornamental vertical tiling and battening, &c., to gable of back dormer.
3 3 3	8 8	
5 9		Plain vertical tiling and battening, &c.
9 4	4 4	
2 1 0	2 0	Raking, cutting, and waste on do.
2 4 3	8 6	Do. on ornamental vertical tiling.
1 6 6		Ornamental vertical tiling and battening, &c., as before to gable of dormer to loft.
4 0	13 0	
2 5 0	10 0	Raking, cutting, and waste on do.
6 9		Plain vertical tiling and battening as before.
2 9 0	18 0	Raking, cutting, and waste to do.
39 0		Ornamental vertical tiling and battening plugged to wall, front facing yard.
5 6	214 6	
6 0		
5 6	33 0	Deduct do. loft floor.
3 5 6	16 6	Cutting and waste.
7 3		Raking do. and do.
18 6		Ornamental vertical tiling and battening as last retn. next dwelling.
8 9	161 11	
2 8 9	17 6	Cutting and waste to do.
39 0		Cutting and waste to ornamental vertical tiling and battening to fit to rafter's feet.
18 6		
44 1 0	44 0	Add for rafters.
39 0		
9 9	29 3	Plain vertical tiling and battening.
6 0		
9 4	6 6	Deduct do.
2 9 3	3 0	Cutting and waste to do.
18 6		
1 3	23 2	Plain vertical tiling, &c., as before.



# ROYAL SOCIETY OF PAINTERS IN WATER COLOURS.

THE winter exhibition of sketches and studies at the gallery of the Royal Society of Painters in Water Colours, Pall Mall East, is, on the whole, equal in the variety and quality of its work to the last few exhibitions. The traditional school of water-colour painters is represented, though not to the exclusion of works belonging to the modern methods—call them what we may, "Frenchy" or "Impressionist." There is painstaking and finished work shown by the pencils of Wilmot Pilsbury, Birket Foster, George A. Fripp, William Collingwood, William Callow, and T. M. Richards, always welcome and truthful, and there is the broader but equally natural and healthy impressionism found in such works as those of Miss Clara Montalba, who is well represented on the walls, and Ernest Waterlow. The former are, as usual here, stronger than the latter, but we are glad to find a more liberal discernment of merit. R. Thorne Waite, whose work is generally charming for its naturalness and fidelity, sends several drawings of rural uplands and Sussex pastures. His 22, "Dividing the Flock," with its little nestling village and church "under the hill" by the sea, is one of them; "Bramber, Sussex" (171), sketches at Shoreham and Arundel (233), "A Hampshire Cornfield" (239) are others showing keen observation of sunlight effects. Norman Tayler, one of the younger Associates, has a delightfully-drawn group of "Village Belles" (14) and sailors, the colours soft and aerial. As a delineator of old costumes and historical *genre*, H. G. Glindoni has made his mark. "The Solo," "Height of Fashion" (24) are clever studies; but the chief work of this artist here is "Revolutionists." Two enthusiastic Jacobins are seated at a small table enjoying their glass of red wine; one leans over table with an air of eager expectancy, while his comrade, in cocked hat and choker, scans a document. The expression, drawing, and colour are excellent. Samuel J. Hodson, another Associate, sends a nice drawing of old houses with frescoes at Verona, "La Casa dei Giganti" (26), besides some sketches from Siena. A clever drawing of sculptured altar-piece in Christchurch, Hants (27), by W. Collingwood, may be noticed. Of the other numerous landscape and mountain studies by this indefatigable artist we can only say they make a small collection, the Continent and our own land affording the material. Of course, the great attractions of this exhibition are the beautiful works and studies contributed by E. Burne Jones, A.R.A. "Caritas" is a noble example of emotional painting of which Mr. Burne Jones is acknowledged a leader. A heavenly look of pity and maternal tenderness is depicted on the face of "Charity," who holds two infants in her arms, four others at her feet clinging to her robes. The oil-like opacity, finish, and subdued tone put one in mind of Italian work; the drawing also is less stiff and unnatural than usual. In short, the artist is less distinctly ascetic in the chubby children. The other designs and pencil sketches for heads and drapery at the end of gallery are of exceeding interest to the admirer of the intensely spiritual and poetic phase of art, of which Mr. Burne Jones is so consummate a master. We point especially to designs for figure of Hope (84), the head of Mermaid (95), and his carefully-drawn pencil studies of female heads (85 and 88), perfect in their sweetness of countenance and ineffable expression. "Caritas," in its monumental gilt frame, is a finished picture. These are equally valuable as studies of expression, wistful in their sad but earnest faces, and deeply soul-stirring. Very instructive as a contrast are Sir F. Leighton's draped studies (87, 90)—the last a sketch of Andromache for his large picture in 'his year's Academy—a refined classical grace characterises these sketches on brown paper, removing them equally from the sensuous, and from the asceticism of the Rossetti or pre-Raphael school. In the corner of gallery another of Burne Jones's finished works, "An Angel" (62), displays a sweet, sorrowful face; the style and treatment and colour are quite in the early Italian manner. Arthur Hopkins's "Golden Hour," a view of a headland and village bathed in a red sunlight, is admirable in harmony and the drawing of figures on the quay. William Callow, so favourably known

for his clever sketches and architectural groups of Continental cities, is as strong as ever: no less than 12 subjects are hung. The "Venice Canal" (46), his "Dieppe" (55), "Torquay" (191), are inimitable sketches of craft. Grouping, light and shade, and colour are the qualities that distinguish Mr. Callow's work, no less than the dexterous manipulation of his pencil, washes of grey and warm colour, accentuated by touches and lines. His "Bargate, Southampton," "Market Day, Coburg" (258), "Broadstairs" (341), and river scenery are all clever. An even more subtle handler of the brush is Clara Montalba, whose subtle renderings of landscape and craft suffused in sunlight are always pleasing, sends several Swedish studies and sketches. "A Swedish Village" (78), in its silvery-grey light, the sky and sea separated by a streak of land, is a delicate piece of colouring. "The Royal Palace, Stockholm," and the grey distant view (181), "Fishing Boats" (215), and "A Fortress by the Sea" (267), are lovely impressions. Alfred W. Hunt is a master of atmosphere. His "Whitby Smoke" (76), "Moonlight" (92), "Robin Hood's Bay"—an exquisite bit of mist and handling; No. 203, a sea-fog effect, and "Wind of the Eastern Sea" (358) are delightful studies of the sea-mist so frequently noticed along the East Coast of Yorkshire. Sir John Gilbert's sketch "After the Battle" (77) is, to our mind, equal to the picture in its freedom of line and colour; so is "The Enchanted Forest" (103), and the president's sketch for the large picture of "Cardinal Wolsey" (177). Passing another suggestive group of four faces by E. Burne Jones (107), we can only briefly mention Wilmot Pilsbury's excellent and feeling collection of studies of landscape. His "Misty Day in October," a winding lane between hedgerows and fallen leaves, is charmingly delicate, and the atmosphere most truthfully rendered. Some nice drawing is seen in J. Parker's "Fisher Girl" (157), in George A. Fripp's "Dunstaffnage Castle" (160), and the technical manipulation shown in the rocky landscape "The Couple, Sark" (200). Albert Goodwin, an old member, in his brilliant sketches of "Lincoln" (205), his delicate bit of blue hills and gorge (223), "Clovell" (247), and other Devonshire and Swiss studies, recalls the careful pencilling of the older school, in which category we must place the work of Birket Foster, who sends nine studies, all of them truthful transcripts of nature, rendered with loving minuteness of detail. The sketches of Charles Robertson (125) are numerous and varied. E. J. Poynter sends three studies in chalk. Sir O. W. Brierly, Charles Davidson in his clever coast study (145); Herbert W. Marshall (176), W. Eyre Walker, Tom Lloyd (194), Walter Crane, Mrs. Allingham, on the screen; R. Barnes, H. Clarence Whaite (264), Robert W. Allan (56, 339, 265), are other contributors who help to maintain the reputation of the Old Water-Colour Society.

## ARCHITECTURAL ASSOCIATION.

THE fourth ordinary meeting of the current session of the Association was held on Friday evening, the President, Mr. H. D. Appleton, in the chair. The following new members were elected:—M. J. Culligan, H. A. Dives, R. A. J. Paxton, H. C. M. White, W. Vaughan, W. H. Finch, E. B. Wetenhall, J. S. Millbourne, W. Stainer, H. J. Gamble, C. S. Stone, G. D. Curtis, J. P. Cooper, A. C. Bredin, V. P. Simpson, S. W. Cranford, H. T. Cooper, G. H. C. Cole, H. S. Potter, R. Savage, E. J. Wellman, E. F. Devitt, J. L. Williams, W. L. Lucas, W. H. Barton, T. Jenner, S. Gluckstein, and J. E. Capell.

## IRISH ARCHITECTURE.

A lecture on the history and development of Irish architecture was given by Mr. John L. Robinson, A.R.H.A., of Dublin, and was illustrated by 106 photographic views taken by the lecturer, and exhibited with the aid of a lantern. They were shown in chronological order, and were gathered from every part of the island, ranging in period from cromlechs and stones marked with Ogham inscriptions to the crosses and round towers, and so on to the churches, the fortified abbeys and castles, to the Four Courts and Houses of Parliament erected in Dublin at the close of the last century. The

exhibition and explanation of the views were pleasantly relieved by the telling of anecdotes and reminiscences of travel racy of the soil.

Although the remains of ancient architecture now existing in Ireland are, Mr. Robinson remarked, few in number and singularly devoid of detail, yet a great amount of interest attaches to them as records of the condition of the country at different periods of its history. The sepulchral tumuli which abound are the only evidence which now exists of the Tuatha de Danaans, a race which inhabited Ireland until the invasion of the Milesians about 1,000 B.C. Some of these tumuli which are scattered along the banks of the river Boyne, from Drogheda to Slane, are of large size. The most notable is New Grange, an artificial mound covering a long passage of upright stones, with lintels over, leading to a cruciform chamber, about 30ft. high. Some of the stones composing the passage, and those at the entrance, are covered with ornament of the simplest character, such as lozenges, zigzags, and concentric circles. The mound at New Grange is surrounded by a circle of monoliths, placed at equal distances apart. The entire internal arrangement of this tumuli bears a great resemblance to the pyramids of Egypt. Cromlechs are also very plentiful, as well as stones with Ogham inscriptions, which consist in notches cut on the edges of the stones. It is probable that with very few exceptions timber formed the principal material used in the construction of dwellings until a comparatively recent period. The earliest examples of masonry are of a Cyclopean character, the stones used being of large size, closely fitting together, and the doors and windows have sloping jambs and lintels over. Some of the churches at Glendalough and Clonmacnoise partake of this character. In the West, rude huts of dry masonry, like beehives, are to be seen, which were used as dwellings by hermits in early Christian times. In Keeling Church, a small building attributed by Petrie to the 6th-century, is an Etruscan door with a Greek cross cut in relief on the soffit of the lintel. There are several examples of stone-roofed churches or houses, the best known being St. Columba's house at Kells; St. Kevin's house at Glendalough; and Cormack's chapel at Cashel. The development from the lintel is easily traced; first, the lintel is scooped out to form an arch over the open, then the arch is formed of three stones, and later on many stones are used. In the same way the earlier doors and windows have square jambs without ornament, then a fillet was worked on the edge, or bead, and by degrees the ornament developed until it culminated in the beautiful and distinctive ornament to be seen at Ardert, Glendalough, Clonmacnoise, Cashel, &c. The great peculiarity of Irish, that is, pre-Norman, architecture is the large use of interlaced ornament, which was carried, at the same time, to such perfection in metal-work and in illuminated manuscripts. The same ornament occurs in the doors, &c., of the later round towers, and forms the principal decoration of the crosses. Some attention has lately been bestowed on the fact that large numbers of crosses, or rather fragments of crosses, covered with interlaced ornament, are to be found in Scotland and the Midland Counties. This is easily accounted for by the fact that, from the sixth to the tenth centuries, when the entire of Europe was overrun by barbarians, Ireland kept alight the lamp of learning and Christianity, and sent her missionaries to all parts of the world, whilst the noblest families of Europe sent their sons to be educated at the renowned colleges of Ireland. Hence the missionaries brought artificers and their art along with them, and their Celtic ornament is to be traced at Iona, Lindisfarne, through England, Normandy, Switzerland, and many other parts of Europe. The round towers are peculiar to Ireland, and have given rise to several theories about their origin. Some say they were built by the Phoenicians, others by the Danes, or by the Fire-worshippers, or that they were Buddhist temples. Dr. Petrie was the first to show that they were decidedly of Christian origin, by analysing each theory and exposing its weak points and contradictions. He also proved that they are never found unconnected with ancient ecclesiastical foundations; that their architectural styles exhibit no features or peculiarities not found in the original churches with which they are locally



connected, when such remain; that on several of them Christian emblems are observable, and others display in the details a style of architecture universally acknowledged to be of Christian origin; and finally, that they possess, invariably, architectural features not found in any building in Ireland ascertained to be of Pagan times. He then proves that they were used as belfries and watch-towers, and also as places of refuge in times of danger, the doors being placed at such a height from the ground as to favour such a theory, which is supported by the many entries in the Irish annals of forays by the Danes on the churches, and that the clergy took refuge in the Cloichtheagh, a round tower. The crosses are also almost peculiar to Ireland. Several of them are covered with figures representing Scripture subjects, the Last Judgment often appearing at the junction or the arms around the crucifixion. The old churches are all of very small size, the cathedral at Glendalough measuring 37ft. by 55ft. in length. The development of the ornament is easily traced in the different examples which still exist. King Cormac's chapel at Cashel, which was finished in the year 1134, is the latest and most ornate example of the style. All the arches are semi-circular, the piers or pilasters square and covered with ornament, and the roof or panel vault with ribs dividing each bay. There is no doubt that but for the Anglo-Norman invasion there was every probability of the development of a style of architecture differing in material respects from the rest of Europe. The architectural result of the Anglo-Norman invasion was that the invaders imported their notions of architectural taste with them, and all subsequent buildings in Ireland show similar detail to English architecture; but owing to the hardness of the building stones and the poverty and unrest of the country, the detail is generally poor and the mouldings few and shallow. All the abbeys and churches were built so as to stand a siege, and some of them differ little in appearance from feudal castles. Notwithstanding the change in architectural style, it is surprising that the interlaced ornament still survives, and is to be seen in the capitals at Perpoint Abbey, and in the masons' marks at Cashel, Holy Cross, and many other buildings down to the 16th century. The 15th century must have been a very flourishing time for the building trade, as most of the abbeys which now stand—whether in ruins or not—show details of that period. Any Elizabethan work is generally poor, and the only details are large mullioned windows. During the 18th century, and particularly during the last eighteen years, a large number of public buildings were erected in Dublin in the Classic style. The Parliament House, Four Courts, and Custom House are buildings of which any city may be proud.

At the close a hearty vote of thanks was accorded to Mr. Robinson on the motion of Messrs. S. F. Clarkson and M. B. Adams.

#### BUILDING CONTROL IN PARIS.

MR. FRANCIS HOOPER, holder of the Godwin Bursary for the present year, read a paper on Monday night before the R.I.B.A. on "The Control of Buildings in Paris and its Administration," illustrated by numerous diagrams and maps. The author explained that leases of land for building purposes by private individuals are practically unknown in France, so that no restrictions exist such as are contained in many English building leases to prevent erections which would cause injury to an adjoining lessee on the same estate. Owing, also, to the subdivision of the land, it is seldom possible for an owner of property to effect local improvements for the mutual benefit of an estate and the community. Legislation, therefore, in regard to building operations seeks to secure to building-owners such protection in their mutual relation as shall not be injurious to the public, and at the same time affords to the community facilities for united action when improvements are required in any locality. The French Civil Code of 1804 precisely defines the rights of respective owners of party-walls; it specifies the conditions under which openings for the admission of light may be made on suzerainty in walls abutting on the boundary-line, such being fitted with wire grilles and sashes glazed with obscured glass;

the sills of such openings on the ground story must not be less than 8ft. 6in. above the floor level, and on the upper stories not less than 6ft. 2in. It is further provided that no window-openings from which a view can be obtained over adjoining property (other than the roadway) should be formed in a wall within 6ft. 2in. of the boundary, if such is parallel to it, or 1ft. 11in. if at a right or obtuse angle. Should a prescriptive right be secured by uninterrupted enjoyment of a window during thirty years, the adjoining owner in building must observe a distance of 6ft. 2in. from the face of the wall, but is not restricted as to the height of his building beyond conformity with local by-laws. Such are the servitudes on land imposed by the Code of France. The Alignment Act, which dates from 1607, gives power to municipal authorities to amend the lines of street-frontage by the adoption of a plan of alignment which imposes a servitude on all buildings in old streets which are in advance of the alignment, and preventing any structural repairs to foundations or walls as would prolong their existence before the alignment is effected. This Act, though slow in operation, has been adopted in many of the provincial towns with great advantage. Compensation is paid for the land contributed to thoroughfare, but not for the buildings upon it, as these may be occupied until rebuilding becomes necessary, and the amount (if no amicable settlement be made) is awarded by the jury of expropriation, which is summoned about every six months to settle all disputes which await it. Should it occur that so much of a plot of ground is contributed to the street that it is impossible to erect a healthy building on the residue, the authorities are compelled to purchase the whole, and negotiations are made with the adjoining owner for the acquisition of the surplus, and he may, in turn, appeal to the jury for a valuation upon which he is willing to acquire it. In the event of the failure of all negotiations, the administration may obtain power to acquire the property of the adjoining owner by means of expropriation, and so deal with the two sites together. In Paris the Alignment Act is in constant operation; but the necessity for more rapid improvements leads both public and private bodies to seek powers for the immediate acquisition of property by the Expropriation Act of May 3, 1841, for works of public utility. The procedure involves the preparation of plans, in accordance with certain rules, to fully demonstrate the intentions of the promoters. These plans are exhibited to the public for fifteen days, in provincial cities at the town hall, in Paris at the *mairie* of the *arrondissement*. The exhibition is announced by advertisement and by placards, and an agent is appointed by the Prefect of the Département to attend on his behalf, for three days, to receive and report all verbal and written observations made to him by those interested relating to the necessity or efficiency of the scheme. Should the promoters act on any of the suggestions made in the report, the revised plan is again exhibited; but otherwise it is at once transmitted by the Prefect, with the report and his observations, to the Minister of the Interior, and becomes operative with the approval of the Chief of the State. The scheme having been thus approved, the plan is again exhibited for eight days, to show the property required for its execution, thus affording an opportunity to all persons interested to verify the representation and description of their property, and to put themselves into communication with the promoters for the settlement of their claims to compensation. In the event of the promoters failing to secure an amicable settlement of the claims, application is made to the High Court of Justice for the appointment of a jury to fix the awards. The Act of June 4, 1853, provides that this "jury of expropriation" shall consist of twelve persons, having the same qualifications as in criminal cases—that is, being upwards of thirty years of age, and entitled to the Parliamentary vote. The Court appoints a Judge to preside, and summons sixteen jurymen, with four supplementary persons, whose names are made known to the claimants, together with the offers of compensation. The promoters and the claimants have each the right to cancel two names from the list of jurymen summoned, after which the first remaining twelve

constitute the jury, which remains intact until all claims relating to the scheme are settled. The jury examines documents and witnesses, and also visits the property, and its award is binding on both parties, unless appeal is made within fifteen days to the High Court of Appeal, the costs being taxed by the Judge. The Alignment Act requires the permission of the Prefect of the Département (corresponding to our county authority) to the erection of any building bordering on the public highway. The whole of the streets of Paris are classed as belonging to the highway, and in consequence plans of every proposed building must be submitted to the Prefect of the Seine, and such buildings must conform to the by-laws of the Départements. A special staff at the Prefecture of the Seine is intrusted with the custody of the plan of Paris, and records all authorised realignments, so that when applications for permission to build are submitted to the Prefect the necessary conditions are defined in granting the sanction. Many of the provisions of the Paris Building By-laws are dependent on the strict alignments already referred to, the conditions varying with the effective or intended width of the streets. The height of a front wall in a street 65ft. 6in. in width may be 65ft. 6in.; but in a street of 25ft. 6in. may not exceed 49ft. A building, however, at the corner of streets of unequal width may return along the narrower street for a distance of three times its width. No wall adjoining a thoroughfare may exceed a height of 65ft. 6in., even though facing a boulevard or open square. The roof above the façade must be contained within the perimeter of a semicircle drawn from the face of the wall, its centre being level with the top of the wall, and its radius equal to half the effective width of the street, but in no case exceeding 27ft. 6in. The minimum height of a room erected at the ground level is 9ft. 2in., and of the basement and upper stories 8ft. 6in. Further, the stories may not exceed seven in number above the ground, including attics. The minimum area of courtyards and air-shafts is regulated by the height of the inclosing walls. The legal projections of cornices, string-courses, plinths and balconies over the public thoroughfare are dependent on the width of the street in which they occur, and are measured from the street line, so that where greater projection is desired for the perfecting of a design it is necessary to set back the building; hence the flatness so detrimental to the effect of many of the Paris façades. The *commissaires-voyers* of Paris, whose duties correspond to those of the district surveyor, are twenty in number, and each has charge of one of the *arrondissements* into which the city is divided, with an office at the local *mairie*. The erection of buildings for the public service in Paris is usually intrusted to architects whose designs have been selected as a result of open or limited competition. Such buildings may be classed in three categories: those which belong to the Municipality, to the Département of the Seine (or county), and to the State. The appointment of architects for the two former is subject to the approval of the Prefect. The Prefect of the Département of the Seine is advised on all important questions affecting the architecture of the city of Paris by the *Conseil d'Architecture*, or Standing Council of Architecture, which is attached to the Prefecture, nominated and presided over by the Prefect. It is composed of four of the senior architects in active service attached to the Prefecture, with five honorary architects who are on the retired list, having spent thirty years in the service or reached sixty years of age, together with independent architects, amongst whom are at the present time MM. Charles Garnier and Bailly, both members of the Institut de France. Meetings are held weekly, and the remuneration of the members is by a nominal fee on attendance (*jeton de présence*). On questions relating to the construction of railways, canals, drainage, &c., the Prefect of the Seine is advised by the Council of Engineers attached to the Prefecture, which is composed of experts, nominated and presided over as in the case of the Architectural Council. The Ministers of State are advised on all important architectural questions, such as sites and plans for new public buildings and monuments, the laying out of new thoroughfares, and the improvement of



old streets, by the General Council for Building, which is a standing architectural council attached to the Ministry of the Fine Arts, and composed of the Director of Works of Civil Buildings, four inspectors-general of that service, and four distinguished architects nominated by the Minister. The director and inspectors are permanent members, whilst half of the temporary members retire annually, and are not eligible for reappointment as members until after an interval of two years. All are paid a fixed fee annually for their services, and the appointment as a member is one of the highest architectural distinctions. The present permanent members who are inspectors-general (the late M. Questel's place has not yet been refilled) are the following:—MM. Garnier, André, and Diet, members of the Institute of France; and the temporary members for 1888 are the following:—MM. Faure, Moyaux, Le Clerc, and Bernier. Acting on the advice of competent professional judgment, State officials are relieved of much personal responsibility, and the public enjoy the security which such advice affords for the wise administration and expenditure of funds.

Mr. WILLIAM WOODWARD, in proposing a vote of thanks to the lecturer, observed that Mr. Hooper's paper had been read at an opportune moment, as in London the Metropolitan Board of 1855 was about to be replaced by the new county council. It was one calculated to rejoice the hearts of those who were endeavouring to obtain the enfranchisement of freeholds, and also those who objected to the English system of prescriptive rights to light, for neither of these customs obtained in Paris. He believed that most of the litigations in this country about ancient lights owed its origin to the architect employed by the building owner, for the former ought so to arrange his design as to give no occasion for a lawsuit by neighbours. An important part of Mr. Hooper's paper was that describing the alignment of buildings in Paris, a matter absolutely essential to the well-being of a city. If the rules and regulations adopted in Paris were enforced in London, we should have splendid new thoroughfares provided under our improvement schemes instead of mere tortuous cab-routes. The late Mr. L'Anson had pointed out that in Rome, as Mr. Hooper mentioned was also the case in Paris, the plans of projected improvements were publicly exhibited for fifteen days before being finally adopted. Had this been the case, we should not have had at the present time a spur street being constructed from Holborn Town-hall to the Angel only 50ft. wide, to take the traffic of Gray's Inn-road, which had lately been widened to 60ft., and was still no more than adequate. Again, the Metropolitan Board had just given sanction for an encroachment of 35ft. on the building line in Marylebone-road, which, by an Act of George II., was restricted to 50ft. from the roadway, so that this fine boulevard would be ruined, as all the other owners would by degrees bring their houses forward to the new line. The Parisian system of regulating the height of buildings would also have prevented Northumberland Avenue from being spoiled. He also thought it would be well if our public buildings, such as post-offices, were, as in Paris, thrown open to competition, and if consulting architects were appointed to advise the Government and municipal authorities.

Mr. CHARLES FOWLER seconded the vote of thanks. In 1874 the Metropolitan Board proposed an amendment of the Building Act, in which it was sought to regulate the height of buildings. An organised opposition was raised, in which some eminent architects took part, on the ground that it would tend to fetter architecture, and the Bill was thrown out. At the present time a Bill dealing with the same point under the title of "Building in Streets" was before the House of Lords, but he trusted so crude and negligently prepared a measure would not pass. With regard to prescriptive rights to light, he regarded such claims as legal, but not moral, and was glad to find they were not recognised in Paris. He believed we should be better off if the whole system of easements in light were abolished; and, indeed, they were not recognised on certain large estates in London.

PROFESSOR KERR had been struck by the fact brought out in Mr. Hooper's paper that throughout the whole of architectural adminis-

tration in Paris ran the principle, Let architects govern, whereas the exact opposite was the rule in the Metropolis. In Paris regularity of plan was the first consideration in building, while here the liberty of the individual was jealously protected. The French system of employing a council of architects in the government of a city was worthy of attention here. Our law of ancient lights arose out of the common-sense English maxim that neighbours ought to accommodate one another; but the practical inconveniences and opportunities for extortion to which it gave rise were indescribable. The law of prescriptive rights in light was recently discussed at the Surveyors' Institution, when the members came to the conclusion that if the Courts would appoint expert assessors, as the law enjoined them to do, there would not be so much difficulty and variance in decisions as now.

Mr. R. PHENE SPIERS expressed his regret that, under one of the street improvements recently sanctioned in Paris, the small but very interesting church of St. Julien le Pauvre, near the Hôtel Dieu, was doomed. He advised all students who might visit Paris to take the opportunity of seeing and sketching the building.

Mr. T. BLASHILL, superintending architect to the Metropolitan Board of Works, after expressing his thanks to Mr. Hooper for his most useful paper, said all were hoping that the new county council would bring fresh light to bear on the problems of buildings in our Metropolis. We could not adopt, without much consideration, schemes which seemed to work well in other capitals, although it was well to know what was done elsewhere, as the conditions of light and the habits of the people were so different. He thought a hint might be taken by the Institute from the procedure at the Surveyors' Institution, referred to by Professor Kerr. The R.I.B.A. had discussed many questions at length, but always shrank from coming to any conclusion. It would be very desirable if, like other bodies, they would offer a definite expression of opinion on such question as prescriptive rights to light, and terminable leases. He did not think official administration such as Mr. Hooper had described would be appreciated in the Metropolis, and it should be remembered that in Continental towns persons would not give honorary services, as on our boards and vestries. Expert opinion could not be obtained in the Metropolis, he thought, except at a cost beyond what would be paid. Very often if the people criticising our public bodies knew the whole of the difficulties with which they had to contend, they would modify their opinion. No public body could attempt improvements, however desirable, with a reckless disregard of cost. The public entertained an absurd dread of an increase of rates, and every public body was haunted by the fear that they would be charged with spending too much money. Metropolitan rates were low as compared with those in many Continental cities. As to the two complaints made by Mr. Woodward, the spur street from Holborn to Islington was not intended to take the whole traffic of Gray's Inn-road; the width of 50ft. might or might not be too little, but any increase would have greatly added to the outlay. With regard to Marylebone-road, Mr. Woodward doubtless knew that the Act of George II., by which the houses were kept 50ft. back from the roadway, was repealed in 1855.

Mr. WOODWARD said if the restriction was repealed, the more the pity, but the lawyers were not agreed about that; as to the spur street, it would take the traffic of Shaftesbury-avenue and Clerkenwell-road, and he believed 50ft. would be found to be an insufficient width.

Mr. HOOVER, in replying to the vote of thanks, said that a comparison of rates and rents in London and Paris showed that they were much higher in the central parts of the latter city, and Mr. F. R. Farrow, the holder of the Godwin Bursary for last year, found the same held good of Vienna. Mr. Blashill's doubt as to the practicability of getting skilled advice from architects in the metropolis at too great a cost would be removed if there were any means of utilising the experience and skill existing in the standing committees of the Institute. As to prescriptive rights, the principle on which French regulations went was not to con-

sider precedents of the past, but what might be expected to happen in the future. As the restriction of height fell on all alike, it was not felt to be a hardship, and this rule and that defining the area to be left open afforded plenty of light to all. He thought some more uniform system as to the heights of buildings would work satisfactorily in London, and would not be regarded as a burden by architects or building owners.

#### LECTURES ON ARCHITECTURE.

THE first of a course of twelve lectures on "Architecture," illustrated by lantern views, was given in the drawing-room, St. James's Hall, Piccadilly, W., on Wednesday evening, by Mr. G. A. T. Middleton, A.R.I.B.A., M.S.A., assisted by Mr. Cecil Orr. The address was introductory in character, and the illustrations shown included the Pyramids, the Temple of Beni-hassan, the Parthenon, the Aqueduct of Claudius near Rome, the Pantheon, Moscow Cathedral, churches at Ravenna, Bonn, and Caen (St. Etienne), and Salisbury, Bristol, and Winchester Cathedrals. Mr. Middleton adopted as a definition of architecture that given by Fergusson—viz., "the art of ornament and ornamental construction"—and pointed out that it aptly illustrated the difference between periods of true art and art in its decadence. The highest form of artistic skill was required for the class of work included in the term "ornamental construction," which necessitated that the structure should be perfect in all its proportions and groupings, so as to produce a satisfactory appearance without the aid of applied ornament in any form. If the building were required chiefly for ornamental purposes, the structure might first be designed ornamentally, and then further beautified by the ornamentation of its parts. The first decadence of a style was to be observed in the attempt to make up for discrepancies and defects in the original design by profuse and unsuitable ornamentation, thereby destroying all rest for the eye, by covering the plain or unoccupied spaces in the fabric. In addition there were three great practical objects which must be considered, and which were the principal causes of the variety in style—viz., the purpose for which the work was executed, the climate of the country, and the materials available, these again being affected by the national characteristics of each tribe. The lecturer proceeded to show that the earliest attempts to secure shelter made by man were the burrow, the hut, and the nest in a tree, each analogous to the homes of lower animals, and each still to be found in use among savage nations. In most cases the tree residence was early abandoned, and the hut and cave types were modified, and to a certain extent amalgamated. The builders in stone and in wood steadily developed their arts, stages in which could be traced in the Lycian tombs of Syria, the mighty walls and so-called treasure houses of early inhabitants of Greece, the Etruscan tombs of Italy, and the dwellings and tombs of the Early Irish. The most ancient building of importance existing in a reasonable state of preservation was the Great Pyramid of Egypt, erected at a date which was open to much dispute, being placed by some at between 3500 and 3000 B.C.—i.e., during the lifetime of Adam according to Bible chronology—and by others at 2400 B.C., or shortly before the Call of Abraham. The earlier date was most commonly received by architectural writers; but from a practical point of view the later was more probable, as it was hard to believe that the earliest example of the style was also the largest and most perfect, in contradistinction to all others. The later date for its erection gave us a semi-developed model, from which it might have been perfected, in the so-called Temple of Belus, or Tower of Babel, erected on the plains of Babylon about 2250 B.C., the remains of which still existed in the form of a mound of ruined brickwork. From this period the art divided into the two definite streams of the pure Egyptian and Assyrian arts, to meet again, but not to re-unite, in that of Greece under Pericles at Athens in the 5th century B.C. In Egypt and Assyria both wood and brick were in common use, but in methods subject to the forms in which they were obtainable. The foundation of all subsequent art was laid down in forms which were never after



by any civilised nation totally abandoned. To this day in the East a simple form of flat-roofed structure was to be found, consisting of a chamber inclosed by four walls, having a flat roof combined as a porch over the entrance, supported by two posts. It was early noted that the posts decayed if set directly in the earth, and hence they were each raised on a block of stone, and eventually were replaced in many cases by masonry or brickwork. Another consideration affecting the development of art was the cost of the various materials, and as stone was at all times and everywhere expensive, the walls of the houses of the poorer classes were often composed of mud concrete, kept in position by woodwork till dry. The only timber available in Egypt was the palm, which was virtually worthless, owing to its softness and excessive elasticity, and various species of reeds, which were used for roofing and as moulds for hollow cylinders to be filled with mud. Assyria was fortunate in the possession of unlimited supplies of first-class timber and quarries of easily-worked stone. Small as these beginnings might appear, from them were developed the two orders of architecture in general use by the Greeks, and to which the names of Doric and Ionic were given, from the names of the tribes by whom they were perfected. In Greece the art was carried to perfection between the 7th and the 4th centuries B.C., in which period the Parthenon and the Erechtheum, which had never been surpassed, were erected on the Acropolis at Athens. The rise of the third Greek order—the Corinthian—was next referred to, the lecturer remarking that, notwithstanding the name, there were no examples of that order to be found in Corinth. This order was never perfected by the Greeks themselves, but was developed and debased by the Romans. The great characteristic of Roman architecture was the development of the arch, which though probably well known to the Greeks, was ignored by them. Its influence was to be felt in all Roman work mixed in late examples with the antagonistic art of Greece, and from that incongruous mixture was evolved the embryo from which our Pointed work arose. In referring to the decadence of Roman art under Constantine, Mr. Middleton remarked that that emperor established schools for the culture of architecture in A.D. 334, and from his time dated the new and healthy styles known as Byzantine and Basilican, the former of which reached its height in the Church of the Holy Wisdom at Constantinople, built about the middle of the 6th century, and the latter, in its extended form called Lombardic, in the cathedral at Pisa, at the commencement of the 13th century. Architecture at this period was divided into such a variety of young and vigorous branches, all having the germs of a distinct and genuine perfection, that it was difficult to follow out the threads without being involved in utter confusion, a difficulty the more tantalising as each branch when developed formed a distinct style in itself. Constantinople and Rome might be taken as the birthplaces respectively of the Byzantine and Lombardic styles; the former city, having by far the more widespread and varied influence on Mediæval art and its outgrowths, continued to flourish vigorously to a later date than those of Rome, being uncontaminated by the Italian revival of Classic forms at the commencement of the 15th century. Its four chief branches were the Armenian, the Persian, the Saracenic, and the Russo-Byzantine. The European development of Byzantine art first made its appearance in Ravenna, in the first half of the 6th century, at the church of St. Vitale, and the influence was felt a very little later in the small basilica of St. Apollinaris in Classe, where it united with the Basilican forms, and in so doing made that city the central point from which the great European styles may be taken as branching. The style appeared in a later form at St. Mark's, Venice, and affected European work still further. To obtain a proper insight to the progress of the second branch of the great Roman collapse it was necessary to return to the time of Constantine. That Emperor allowed the Christians certain of the old courts of law or basilicas throughout Italy for use as churches, and these being suited for the purpose, were copied in all the new buildings, and hence the rising style was termed Basilican. In a short time it reached its zenith,

and from about the 6th century the great European stream of art, broken into several branches, the main one, called Lombardic, keeping strongly to Basilican types, but distinctly affected by Byzantine influences. It took its course through Lucia to Pisa, where it was perfected in the 13th century, and also overran the entire plains of Lombardy. Another branch travelled through Switzerland into Germany, commencing at St. Michael's Church, Hildesheim, at the close of the 10th century, and ending suddenly at Trèves and Bonn in the 13th century before reaching its full development, being overwhelmed by the more vigorous glories of the perfect Pointed work of France. The third stream led to Paris, which was strongly affected by Late Byzantine work; the latter passed through Venice in the 9th and 10th centuries, and so through the South of France to Angoulême, Périgueux, and the Pyrenees. This branch was almost overwhelmed in its infancy by the inroads of Northern barbarism; but it gained strength, vitality, and purity by its trials, and rose far superior in poetical expression and absolute versatility to all others. Leaving Paris, it travelled through Caen and Canterbury to Durham, where it developed the perfection of the round-arched style in the 12th century. It was accompanied by a most interesting string of examples of Byzantine foliage travelling from Périgueux through Paris, and Canterbury to Lincoln, by which direct connection can be traced in its acanthus form between the Greeks of the 4th century B.C. and the English of the 13th century of our era—a period of at least fifteen hundred years. Until the close of the round-arched Gothic style, foliated ornamentation had never satisfactorily recovered from the debasement it underwent in the Late Roman period; but the latter half of the 13th century a truer spirit entered the minds of the artists, and instead of trying to imitate the semi-barbarous ornamentation of their predecessors, they went directly to the school of nature. They gave themselves up not to mere copyism of natural forms, but to thorough study of the laws of growing vegetation, and wrote in stone the result of their researches. The lecturer next traced the changes and development which Gothic fenestration underwent between the 12th and 15th centuries, and showed how the growing desire for a larger display of traceried outlines and of stained glass surfaces gradually reduced the stone work of our churches into a mere framework for glass. Just as the latest phases of these attenuated and shallow forms of masonry seemed about to develop into something nobler and better, the Renaissance Classic learning came with an inrush which swept the old styles away and begun an era of copyism. This prevailed throughout Western Europe in the 16th and 17th century, and became almost mechanical in its adherence to Classic canons and proportions known through the pages of Vitruvius. Art seemed for a long period dead, but was merely asleep, and had, since its awakening, been almost madly alive in its struggles to regain a true existence—particularly in England. In this country we have tried, during late years, revivals of Italian Renaissance, Perpendicular and Decorated Gothic, a form of Dutch Renaissance, Early English Gothic, and a modern form of French Gothic—all, so far, without success. The latter is in full favour at the present day, and there were some grounds for the hope that a new national style would arise, and, if so, it would come from the same source as of old, for at all times England had been, and still was, indebted to France for her dawn-inspiration of art. Of one thing we might be sure—that so long as we studied the true spirit of Classic and Mediæval ages, together with what was required at our day, and went to nature's day school of ornament, we should yet do well, and need not be afraid of the ignorant criticism rife everywhere.

#### WATER MAINS.

THE loss by friction and other causes to the flow of water in mains has been a subject of interest to engineers, and various formulæ and tables are in use that are supposed to give the results of experiment. Practical hydraulicians find these are not always to be relied

upon, and the exigencies of a public water supply and the extension of mains and branches materially interfere with the assumed calculations and estimate of supply. Mr. Charles B. Brush, in a paper recently read before the American Society of Civil Engineers, has given some useful data, the results of experiment, bearing on the subject, and in relation to friction, waste, and loss of water in mains. He refers more especially to the friction, or head in feet, necessary to obtain different velocities in pipes of given diameters. The Hoboken water supply furnishes some useful experience that may be fairly applied to other towns. Mr. Brush tabulates the results actually obtained, and those resulting from formulas using the same data as to head, length, and diameter. He shows that the quantity of water that can be economically delivered through a 20in. main under a static head of 165ft. is about 3,350,000 gallons per day. This delivery requires a velocity of 2.36ft. per second, and develops a friction head of 1.029ft. per 1,000ft., or 5.43ft. per mile. The formulas that are found to agree best with the results are those of Lampe and D'Arcy. The table showing actual and theoretical friction heads per 1,000ft. at the above velocity of 2 to 3ft. per second are close. The D'Arcy formula is  $h = .020889 \frac{L v^2}{2g d^5}$ . The heads

given by it differ very little from the results actually found. Wiesbach's formula is higher, Prony's and Eytelwein's higher still. As the first-named formula is based on experiments made with pipes 367ft. long, the largest diameter being 20in.; it has certainly a preference over formula based on short lengths and small diameter.

Referring to waste of water and means of prevention, the author shows by figures how much Hoboken has saved by meter. It was first supplied under the hour-rate system; the population in 1882 was 33,000 people. For the first six months of the new supply the average daily consumption was nearly four million gallons, half of which was found to be waste. By the system of the new supply, the waste has been reduced to an extent of 1½ millions gallons per day. To the attachment of the meters is attributed some of the saving; but the house inspections twice every year, and the night inspections of the mains and service-pipes have also led to the result. It is stated that the universal meter system has assisted in determining leakage from the mains; certainly the diagram showing the draught each hour is instructive. A pressure in the city 25 per cent. higher than formerly has been maintained—an important gain. Still there are more gallons per head delivered than can be accounted for, an experience that is found in nearly every town supplied by a company. What becomes of the water no one can say—we cannot put it all down to leakage. By the meter system it is possible to find the amount drawn through the service pipes of consumers, and if the quantity supposed to be delivered into the mains can be estimated as it ought to be, the difference between these two quantities ought not to be a large amount. A large proportion of this difference is accounted for by street fire-hydrants, flushing sewers, and street watering.

The building which has been erected for a Free Library in South Lambeth-road was opened on Saturday by Mr. Mundella. A letter was read from Mr. Henry Tate, of Streatham and Liverpool, who had given the site and the building, offering £5,000 towards providing a similar library for Brixton, on condition that a second £5,000 is raised by March 31st next. The building is Queen Anne in style, of a Domestic type, and the materials used are red bricks with Portland stone dressings, green slates for roofs, and copper domes to turrets. The interior facings of reading-room are of stock bricks relieved with red bands and courses, and the floors are of wood blocks, except the corridors, which are paved with tiles. Adjoining is a house for the librarian. The architect is Mr. Sidney R. J. Smith, and the builder Mr. B. Nightingale, of Lambeth.

The memorial to the late Archdeacon Iles will take the form of an alabaster effigy to be placed on a monument, which will be erected in Lichfield Cathedral.

St. Joseph's Roman Catholic Church, Southampton, which has been altered and restored from plans by Mr. Leonard Stokes, of London, was opened on Tuesday week.



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## ILLUSTRATIONS.

THE DUCAL PALACE, VENICE.—THE PEOPLE'S PALACE, EAST LONDON.—ALTAR RAILS OF ST. ALPHEGE'S CHURCH, GREENWICH.—NEW PREMISES, DAIRY SUPPLY CO., BLOOMSBURY.—ST. JAMES'S CHURCH, INVERLEITH.—COACHMAN'S HOUSE AND STABLES.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## THE DUCAL PALACE, VENICE.

ALTHOUGH this world-famed building is so well known to our readers, scarcely an apology is needed for its further illustration, especially by so admirable a photograph as that which we reproduce to day, giving the façade so carefully in detail as seen from the other side of the Piazzetta, showing the campanile of the church of St. Giorgio Maggiore, with its front designed by Palladio, in the distance, and the Lion of St. Mark on its granite column in the middle of the picture at the end of the Piazzetta. Ruskin's glorification of the Doge's Palace is familiar to all students of architecture, though few critics can agree with all that he has said respecting its composition as a whole—indeed, the upper part seems hardly to belong to the arcades below, while the relative proportions of the two lower stages seem always to us to be scarcely satisfactory, and the absence of bases to the main columns is certainly a defect. The architects engaged on the reconstruction of the Palace as we now see it were the Bon, or Buono, family, the most distinguished of whom was one of the sons, Bartolommeo, whose name is cut upon the Porta della Carta, or principal entrance to the building. Their work dates from 1424, and the Great Inner Court, finished by the Bons, was completed in 1471, though some parts of the sides of it are additions of later date after two fires in 1574 and 1577. We shall give a large detail of the Porta della Carta in an early number. The west side towards the Piazzetta is 230ft. long, and has 18 bays in the main arcade. Among the subjects of the caps are Noah and his Sons, Solomon's Judgment, Adam and Eve, and other subjects from the Old Testament in capricious variety of treatment. The ornaments and statues of both balconies were done by Alessandro Vittoria since 1577.

## PEOPLE'S PALACE FOR EAST LONDON.

ALTHOUGH the Great or Queen's Hall, the public library, and swimming baths, with other important parts of the group of buildings known as the People's Palace, have been erected and opened, that portion which forms the frontage block, facing the Mile End-road, has not yet been carried out. The last design for this work is herewith illustrated to-day by our double-page plate, and the erection of these buildings is contemplated at an early date. Mr. E. R. Robson, F.S.A., under whose superintendence the rest of the Palace has been built, is the architect.

## WROUGHT-IRON ALTAR RAILS IN ST. ALPHEGE'S CHURCH, GREENWICH.

THESE rails, though considerably more elaborate, are of the same date and style of work-

manship as the ironwork in the eastern galleries of the church, illustrated in this journal in the number published October 15th, 1886. They were probably designed by Nicholas Hawksmoor, the architect of the church, in the beginning of the last century. The scrolls are all carefully wrought, and the leaves, which are gilded, are well formed. The handrail at the top is of polished oak. The design suffers somewhat from want of light, the church being finished at the east end with an apse, the only window of which is filled with exceedingly opaque glass. There is some excellent detail in this church, notably the fine Georgian pulpit, with its carved sounding-board.

## DAIRY SUPPLY COMPANY'S NEW PREMISES.

THESE premises, now nearly completed, will form an important addition to the already large site occupied by this enterprising and well managed company, extending as it does from Museum-street, Bloomsbury, on the east, to Duke-street on the west, and Little Russell-street on the south, with entrances from each of these streets. The new buildings consist of large washhouses and dairies on the ground and basement floors, the walls and ceilings of which are lined with white glazed bricks, with a dado of coloured ditto. The building is entered in Little Russell-street, under an arch, with a cartway, specially constructed of fire-proof materials, and finished with asphalt, giving access to a yard in the rear of the premises, called King's Head Yard, and which likewise has an exit into Duke-street. This yard is now covered with a wrought-iron roof, well lighted and ventilated from above, having an uninterrupted span of over 30ft., and paved with wood blocks to deaden the sound of the traffic. Both this yard and the cartway through are so contrived as to answer the double purpose—viz., of loading and unloading the milk churns and also of reducing, as far as possible, the noise of the traffic in the street. The areas next streets are covered alternately with Hayward's prismatic lights and open grills to ventilate the same. The upper portions of the buildings, extending from Duke-street round into Little Russell-street, are planned for numerous suites of dwellings for the employés of the Company, in sets of two and three rooms each, according to the families to occupy them; also separate "cubicles" or dormitories for single men. The staircase and corridors are all fireproof, and have a glazed brick dado. The landings are provided with w.c.'s, and the corridors with sinks, pantries, coal-boxes, &c., to each floor. The topmost story contains the caretaker's apartments and a small laundry. The roof is a mansard, of light but solid fireproof construction, with an asphalted flat above for the use of the inmates protected with wrought-iron railings towards the front, and lofty parapets in the rear. The engraving shows a perspective view of the elevations to Duke-street and Little Russell-street, of a Renaissance character, built generally of stock bricks, with malm and red brick fringe, and further embellished with Portland stone dressings, of which the title of the Company carved in relief in large letters forms a conspicuous feature. The contractors are Messrs. J. Allen and Sons, of Kilburn, Mr. G. Dalton is the clerk of works, Messrs. Franklin and Andrews, of Ludgate-hill, supplied the quantities; and the whole has been executed from the designs of Mr. R. P. Whellock, architect, of 45, Finsbury-pavement, London, E.C. The public spirit evinced by the Company in the erection of these premises reflects much credit upon them, and they will doubtless be rewarded by the increased success of their business, which for years past has been paying a dividend of 7 per cent.

## ST. JAMES'S CHURCH, INVERLEITH, EDINBURGH.

THIS church is situated at the foot of Inverleith-row, near Golden Acre. It consists of a wide nave with flat-roofed aisle extending along the whole length of the nave on the south side, and a finely-proportioned chancel 36ft. long; a tower 24ft. square at the south-east corner, and a north and south porch. A sacristy and organ-chamber are provided on the ground-floor of the tower, and a choir vestry above. The chancel is lighted by a very large east window of five lights, containing tracery of elaborate design, and two windows

of two lights on the north side. On the south side are the organ-arch and door to the vestries. The nave is divided into five bays, with three light windows in each, the pointed heads of the windows being filled with cusped tracery of varying designs. The arches between nave and aisle are of two orders rising from clustered columns having moulded bases and carved capitals. The roofs throughout are open-timber ones. The nave roof is divided into bays by principal rafters with curved framing, the spaces between the rafters being plastered. The spaces between the rafters of the chancel roof are also plastered, and decorated in colour. The timbers of the roofs are stained a dark colour. The nave and aisle are seated with open pews, of simple design. The architecture is Gothic, of the 14th century. Only three bays of the nave have at present been executed, and the tower, which is intended to rise to the height of 110ft., has been roofed-in in a temporary manner at the first stage. The church, which has been designed by Mr. R. Rowand Anderson, LL.D., architect, will, when completed, be a valuable addition to the ecclesiastical architecture of the city, and is a fine example of this architect's work. The carving has been executed by Mr. John Rhind, sculptor. The contractors for the mason and carpenter work are Messrs. Beattie; slater work, Messrs. Wm. Anderson and Son; plumber work, Messrs. Proctor and Son; glazier work, Messrs. Coutts and Cameron; plasterer work, Mr. William Baird; and painter work, Messrs. Moxon and Carfrae—all of Edinburgh. Mr. James Jerdan acted as clerk of works.

## COMPETITIONS.

DOUGLAS, ISLE OF MAN.—At the last meeting of the Douglas town commissioners it was resolved to erect new abattoirs on a site known as the "Lake Yard," situated near the railway-station. Plans submitted in open competition by Mr. Thomas W. Cubbon, architect, of Birkenhead and Douglas, were unanimously recommended by the committee and adopted by the board. The scheme comprises eight private slaughter-houses, one public slaughter-house, with the necessary lairage accommodation attached, and large cooling-house or dead meat market; also accommodation for pig-slaughtering and dressing. The estimated cost of the scheme, including site, amounts to about £7,000.

OTLEY SEWERAGE.—In the competition for the best scheme for sewerage and sewage disposal for Otley, in Yorkshire, the premium has been equally divided between Mr. W. H. Radford, C.E., of Nottingham, and Messrs. Brierley and Holt, of Manchester. Mr. Radford was the successful competitor also at Newhaven, Beaconsfield, and Macclesfield.

## CHIPS.

The fourth annual exhibition of the Aberdeen Artists' Society, which was opened on Monday by the Marquis of Huntly, is on a smaller scale than those of previous years, amateur work having on this occasion been excluded. There are 169 pictures on view, as compared with 512 last year. Of this number over 100 are oils, about 60 water-colours, while there are eight specimens of statuary.

The north transept of Salisbury Cathedral has received the addition to its stained glass of a window, from the studio of Mr. Taylor, of Berners'-street, London, the gift of Mrs. Middleton, in memory of her husband.

Mr. W. Beadel, M.P., the arbitrator in a compensation claim for £73,489, for a residential estate in Cheshire, on the banks of the Mersey, the property of Captain Park Yates, which was taken by the Manchester Ship Canal Company for the carrying out of their scheme, has now made his award. Witnesses for the company valued the compensation at £25,000. The arbitrator has decreed that the Ship Canal Company shall pay Captain Park Yates £37,620.

The parish-church of Middleton-in-Chorbury, Salop, has just been decorated in colour from designs by Mr. A. E. Lloyd Oswell, of Shrewsbury. Messrs. Robert Williams and Son, of the same town, carried out the work.

A new granite entrance has been built to the Guille-Alles Library in Guernsey. Mr. William Sebire was the contractor, and Mr. John Shaw has carried out decorations throughout the library.











S. DEC. 7. 1888.



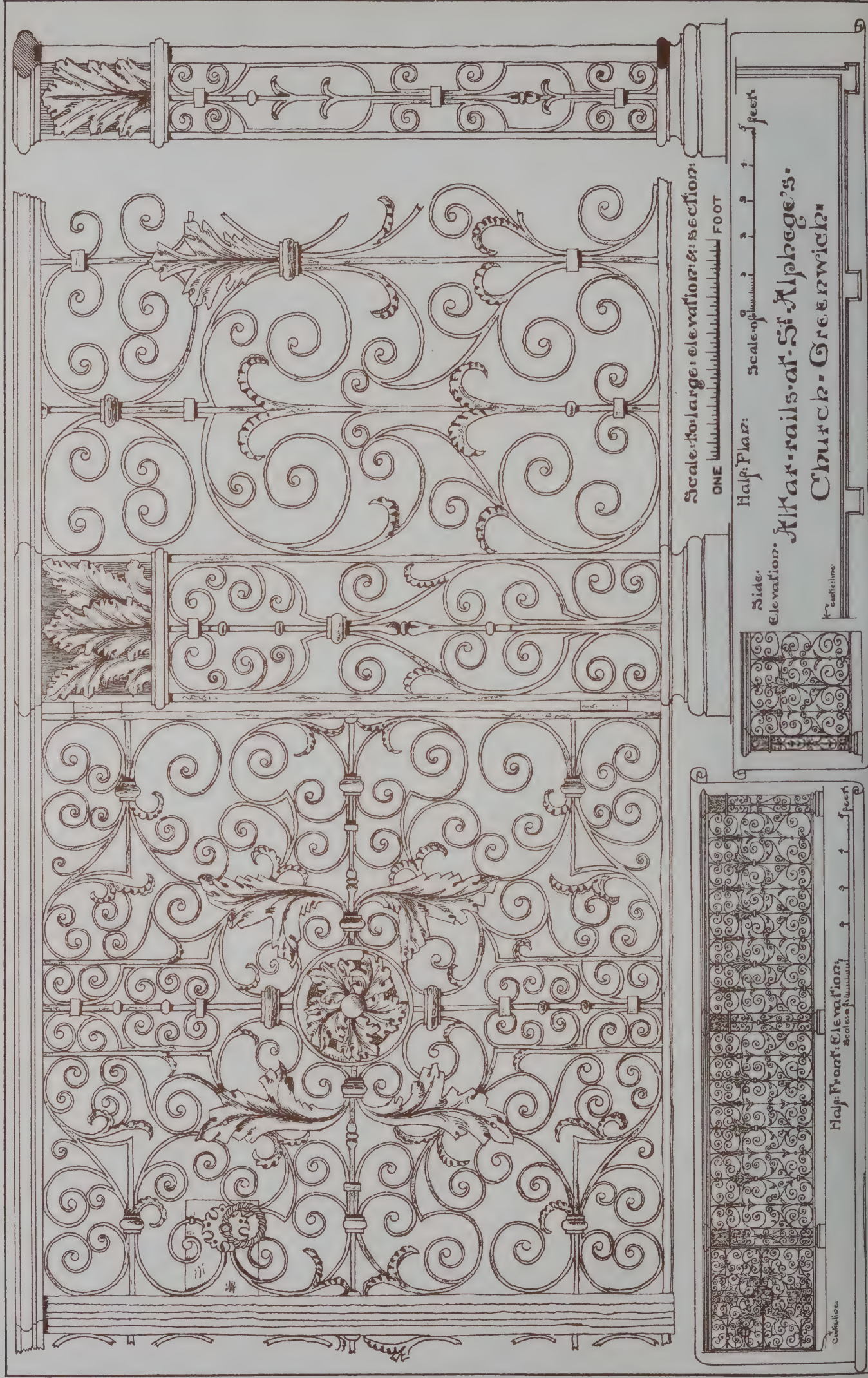


















People's Palace  
for  
East London.

South Elevat





DEC. 7. 1888.

(Central portion)

E. H. Robson. F.S.A. Architect.  
Palace Chambers.  
9 Bridge Street.  
Westminster S.W.











NEW PREMISES · DAIRY · SUPPLY · COMPANY · BLOOMSBURY R · P · WHELLOCK · ARCHT.

Photo-lithographed & Printed by James Alderman 6, Queen Square W.C.

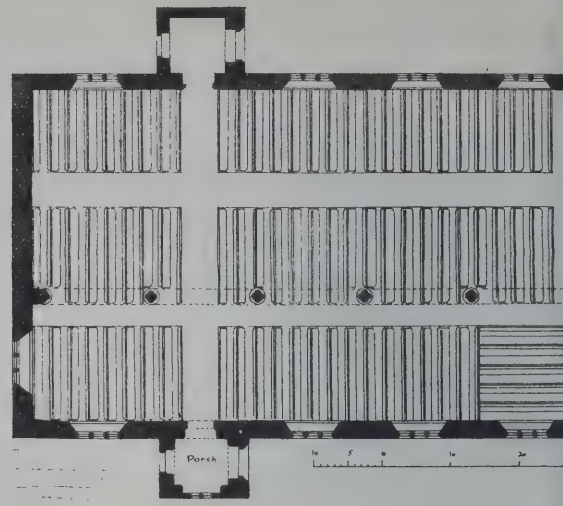
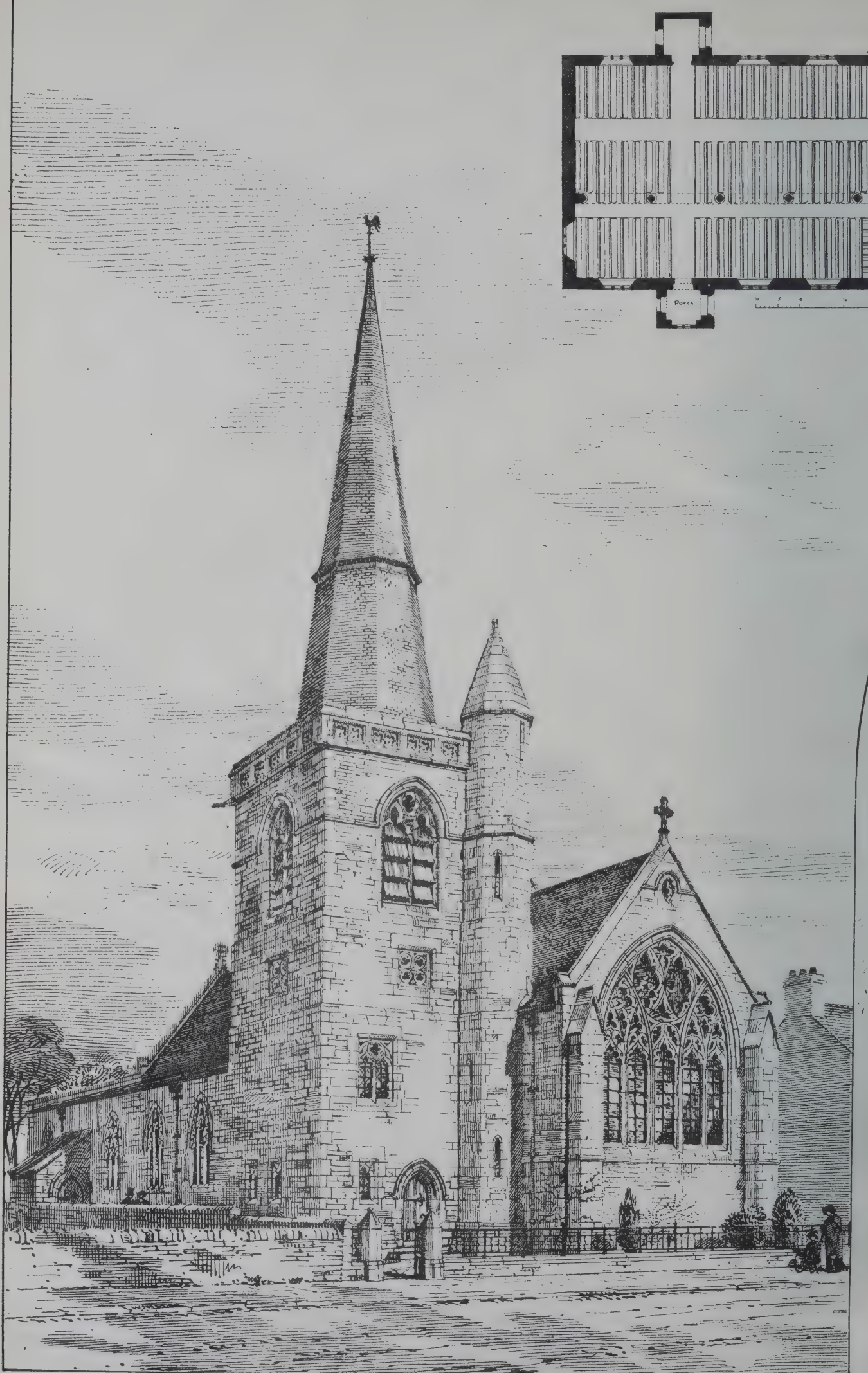






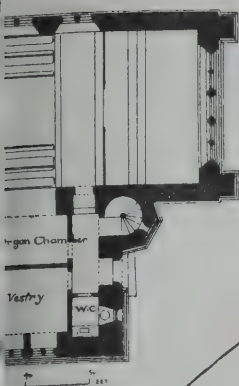








ST. JAMES · CHURCH · INVERLEITH  
DR. R. ROWAND · ANDERSON · ARCHITECT









## WAYSIDE NOTES.

"ALL the World and his Wife" will, I suppose, pay a visit to the French capital in the year of Exposition, and subsequently suffer more or less from recurring nightmares caused by the sight of the Eiffel monstrosity, the which nightmare will perhaps take the form of some horrible vision of four huge serpents rearing their heads together, and threatening destruction on all around. The monster has now attained an elevation of somewhere about 600ft. above sea-level, thus beating all previous records, including old St. Pauls, Cologne, at 515, is, I believe, the highest existing structure in the world—it overtops, does it not, the greatest pyramid at Gizeh by several feet? A few weeks back I saw in a shop-window where French publications are sold, a sheet of drawing showing M. Eiffel's tower amidst an assembly of the giant structures of the world, after the manner of the South Kensington diagram, which, by the bye, I have been told is very incorrect in the figures given. Unlike most French publications of the kind, the drawing referred to is villanously executed, the representation of St. Paul's Cathedral being a bare-faced, libellous caricature.

I was glad to see that the claims of art to a strong position at the Paris Exposition were championed, at the meeting of the Executive Council of the British Section, by Sir Frederic Leighton, who, alluding to the fact that in '78 England had been worthily represented at Paris, said it would, therefore, be damaging if the Fine Art Section of next year's exhibition was not also well and excellently represented. The expenses seem heavy, however. £300 is required for freight, insurance, and other matters if any number of works of art of the highest class are to be lent for exhibition; but only two-thirds of this amount was voted by the Council at the meeting. It appears that the space allotted to the British section of the exhibition has already all been distributed among exhibitors, and that the most urgent appeals to the French authorities has failed in obtaining any increased area on the original space granted. Several Colonies that had desired to participate will therefore be left out in the cold, and have to go unrepresented.

Sir Frederic Leighton had something to say about the external appearance of the National Gallery when he spoke last Monday as President of the newly-formed National Art Association, which held its first congress at St. George's Hall, Liverpool. The N.A.A. is, I understand, a sort of artistic parallel to the British Association, and includes many well-known men among its councillors, or whatever they may be called; Mr. Alma-Tadema presiding over the section devoted to painting, and Professor Aitchison over the architectural section, while Mr. Gilbert and Mr. Walter Crane, Mr. Sidney Colvin and Mr. Mundella respectively have charge of sculpture, applied art, museums, and municipal art questions. It seems to me quite a step in the right direction. As regards the allusions to the National Gallery contained in the inaugural address, Sir Frederic condemned the ugly additions to the gallery—the glass skylight and the campanile-like structure—as monuments of the apathy of the public and the short-sightedness of succeeding Governments. It was only a day or two ago that I was looking at these excrescences, and observing how they ruined the not over-magnificent skyline of the building. The top of the Gallery is now a perfect cruet-stand, as we have long had the pepper-boxes, and now the new skylight has much the outline of the top of a mustard-pot!

Reading Sir Frederic's speech before the N.A.A., one would think the President of the Royal Academy was in rather a desponding mood at Liverpool. But on reflection one comes to the conclusion that the object of the address was to point out the ignorance and apathy of the public with regard to art matters. It was evidently a highly-suitable address, indicating the direction in which the new Association would find scope for endeavouring to bring about reform.

I always had an impression that the Japanese were the finest decorative artists in the world,

or that they were so till many of them became contaminated with vulgar European tastes. Mr. Walter Crane, however, appears to think otherwise. If rightly reported, Mr. Crane, in his admirable lecture at the closing of the "Arts and Crafts," denied the Japanese any credit as decorative artists, though I cannot understand why he should ignore the unrivalled powers of the remaining unsophisticated artists of Japan whose work we most of us so much admire. As space-fillers they are very clever, and space-filling is one of Mr. Crane's strong points in his own beautiful designs. The Japanese draughtsmanship appears to me to be precisely such as is best suited for the design of decoration; and no one will deny the brilliancy and exquisite beauty of the best Japanese colouring. I happen to have been looking through Mr. W. S. Caine's "A Trip Round the World," published but a short time back, and have been interested in his description of his stay in Japan, and his very careful criticisms of the art and architecture of the country. From what one who has never been to Japan can gather, I should be inclined to agree with Mr. Caine when, speaking of the magnificent decorations of the temple at Nikko, he describes them as examples of the thorough mastery of decorative art possessed by the architects and builders of the marvellous buildings of Nikko. These temples, of course, are not modern, or even recent, Japanese work, and therefore, can scarcely be brought into the argument. But the art of Japan, I take it, has remained of much the same powerfully imaginative type down to the present day, excepting where corrupted by Western influences. Speaking, however, of some decorations in the Palace of the Mikado, which is a modern building, about 30 years old, Mr. Caine says that all the rooms of the palace, ornamented with paintings in distemper on a dead-gold paper, are the most beautiful examples of decorative art he has ever seen. Our writer is, of course, merely a layman; but, judging from other portions of his work, he would appear to have the power to criticise decorative design, and all through the large share of the book devoted to Japan, he constantly reiterates the magnificence and incomparable nature of the Japanese decorations; although, unfortunately, he says that the work is deteriorating in many quarters, owing to a lamentable attempt to copy European ways and fancies, and losing that simplicity of composition that so distinguishes the older Japanese art.

At Tuesday's congress of the N.A.A., Professor Aitchison, in the course of his admirable address to the Architectural section, said that when architecture is loved, architects will receive as many pounds as they now do shillings. I feel sure sure that we shall join in expressing a hearty wish that architecture may be much loved at an early date.

The Society of Architects spent rather a less profitable evening at their last meeting than is their wont. Although one must give Mr. Frank Baldwin every credit for his good wishes to forward the interests of the Society, there was little of practical value in his paper. Most of the suggestions were theoretically good only, and a little of this sort of thing goes a long way, as Mr. Buggins said when he put the lime into the muddy compound which he dignified by the name of "mortar." Reform, I take it is gradual and insensible, both in individuals and corporate bodies, and discussions of radical changes do little good. The evening would have been better spent on a paper on some architectural or constructive question such as the Society generally listens to.

Barking is to have a public library. I note that the one in the South Lambeth-road is now finished and open to readers. Brixton wants a free library badly, and Mr. Tate has generously offered £5,000 towards the expenses, if the same amount can be subscribed by 31st March next. I observed the list of tenders for the Chelsea library: a range of from £4,315 down to £2,573 15s. is pretty wide tendering!

The Court of Common Council considered last week a report and plans for a new market, the Markets Committee having submitted a site for consideration on land north of Charterhouse-street, the estimated cost of the building being

£15,000. Market architecture has been "up" of recent years, the late Sir Horace Jones being its chief exponent. One would have thought that the exertions of poor Sir Horace would have set up the City for some time to come, with markets of every description for meat and vegetables, and the fowl of the air and fish of the sea. I am reminded by the subject of markets of a letter or communication to some paper or journal, which stated that recent clearances round Covent Garden have opened up a fine view of Inigo Jones' bold church, and that the view won't remain open for ever.

I have promised myself a pilgrimage to Waltham Abbey to revive my memories of the venerable church, and to call upon old Temple Bar and inquire after the health of the Eleanor Cross. Its constitution, I am told, has been undermined by the restoration. Temple Bar, it is said, is now prettily placed at the entrance to Sir Henry Meux's park. Even if there be nothing in the Bar or Cross to take one to Waltham, there is always the old Abbey church to see, and that abundantly repays one for the journey. It is pleasing to remember that the pyrotechnical experiment of Henry VIII. had not a more disastrous result. Bluff King Hal, the visitor to Waltham is informed, had a portion of the church blown up with gunpowder, and it is no thanks to that aldermanic sovereign that any part of the abbey now remains.

Mr. William Woodward's paper next Tuesday on "The Arts and Crafts from an Architect's Point of View," before the Society of Architects at St. James' Hall, will be worth listening to, and will attract a good audience. The points with which Mr. Woodward will deal are: the arts within the jurisdiction of the architect; the crafts within the jurisdiction of the architect; the education of the craftsman, by professors at technical schools, by apprenticeship, in England, in France; the craftsman on the building; the arts and crafts at the East London Exhibition; the arts and crafts at the New Gallery; the productions at the latter of Mr. Walter Crane, Mr. E. Burne Jones, Mr. William Morris, Mr. J. D. Sedding and lady artists; lessons to be derived by the craftsman, by the public, and by the architect.

GOTH.

## BUILDERS' BENEVOLENT INSTITUTION ANNUAL DINNER.

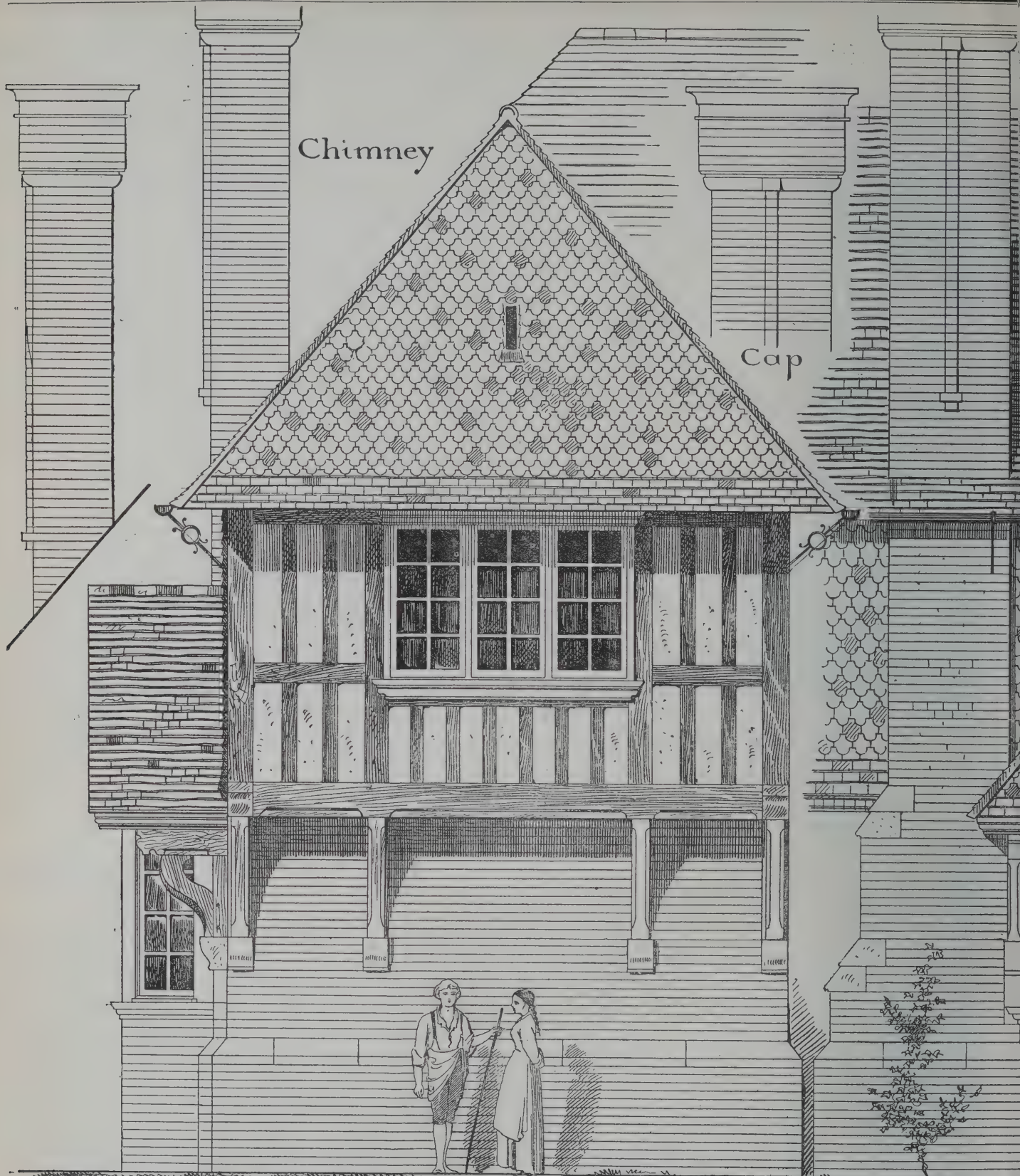
THE forty-first anniversary dinner in aid of the funds of this institution was held on Thursday, Nov. 29, at Carpenters' Hall, London Wall, Mr. J. Howard Colls, president of the institution, occupying the chair.

The Chairman, in proposing the toast of the evening, "Success to the Builders' Benevolent Institution," remarked that he did not wish to say anything against the professions with whom they were associated. As a rule, nothing could be fairer than the treatment the builders received at their hands, but at the same time many of the claims on this institution came from men who had suffered from the exceptions to that rule, from the architect who had supplied defective drawings, and from the specifications of inefficient quantity surveyors. Any one of those troubles was likely to lead to disaster, and they ought to remember that, however stable they might feel at the moment, any one of them might encounter such a calamity as would make them glad to apply for help to such a society as the Builders' Benevolent Institution. The institution had been suffering from the depression of trade, and the subscriptions had fallen off. If there was a time when an institution like this ought to be supported it was in times of depression, and he asked them to support him, and show the world that the builders were a benevolent race. The Chairman added that, as Mr. George Plucknett, J.P., the hon. treasurer, was not with them that evening, they would simply drink the toast without reply.

The toast was duly honoured; others followed, and in the course of the evening subscriptions and donations amounting to £1,053 (of which sum £804 appeared on the President's list) were announced.

Mr. Justice Stirling made an order on Saturday for the winding-up of the Contract Agency Corporation, Limited, on the petition of a creditor.





Chimney

Cap

Front

Gable

Bedroom

Pantry

Plan A.B.

PLASTER  
PLASTER  
PLASTER

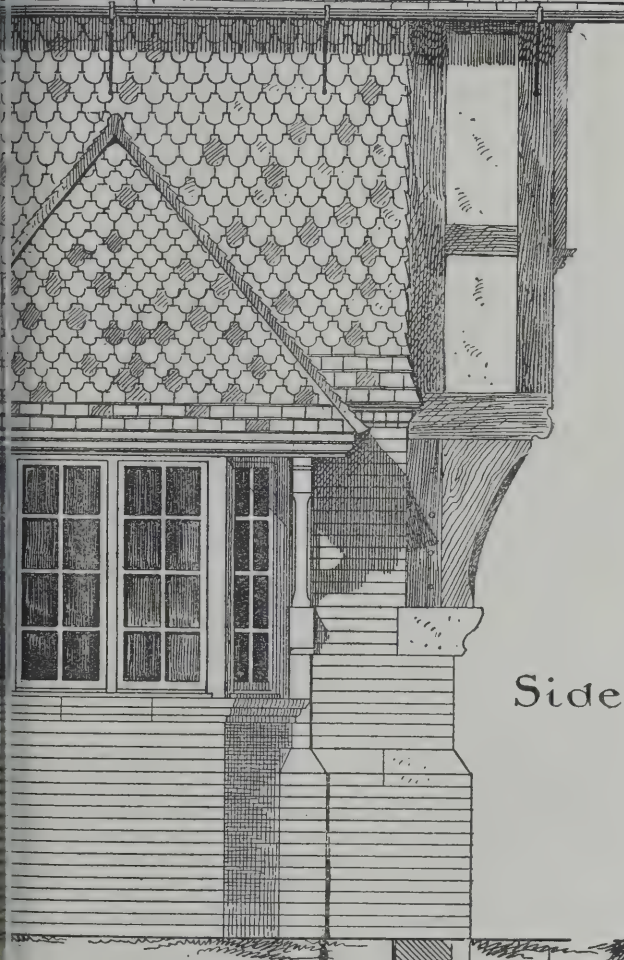
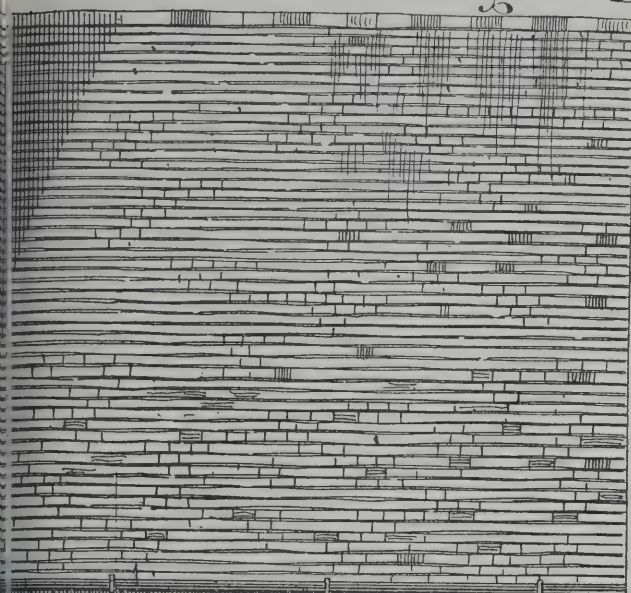
CENTRE LINE

Ground Plan

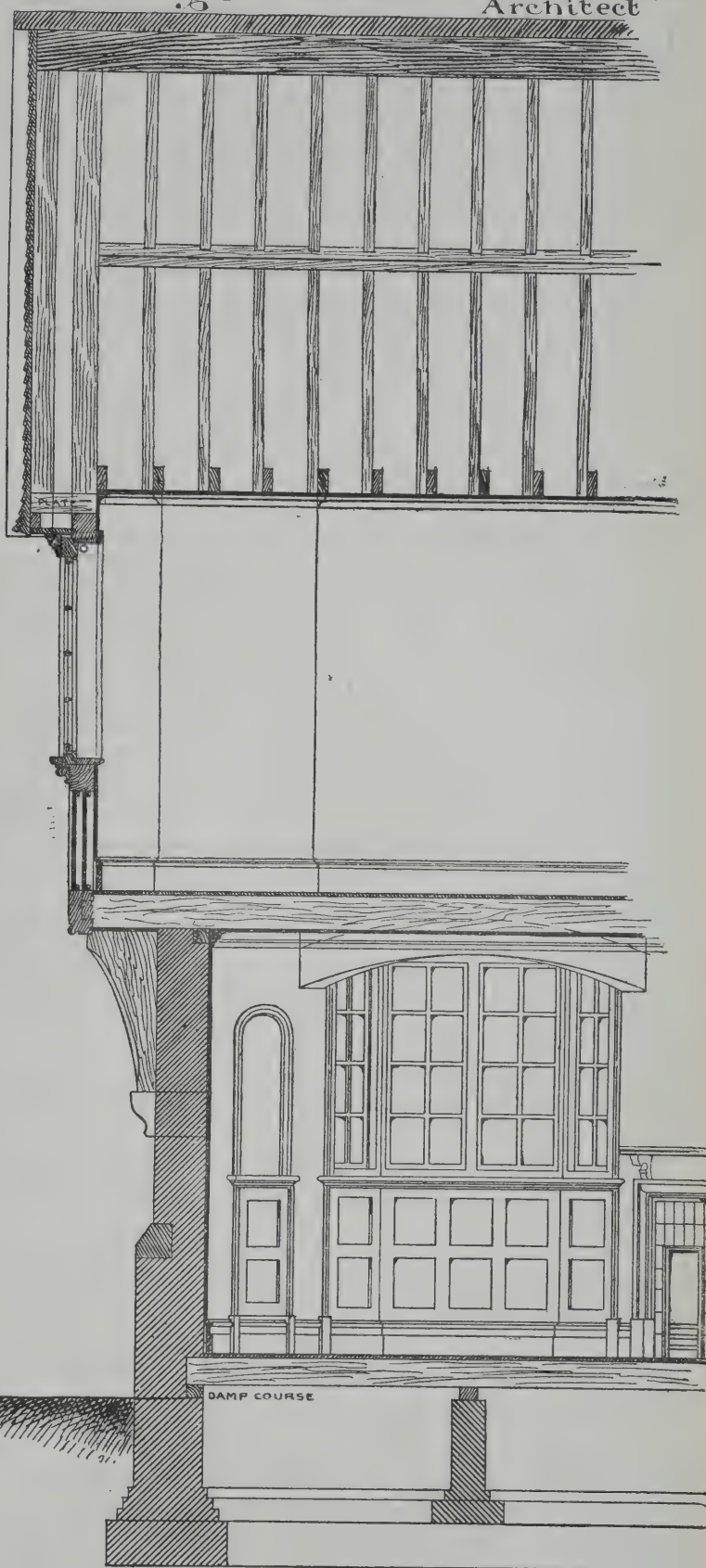
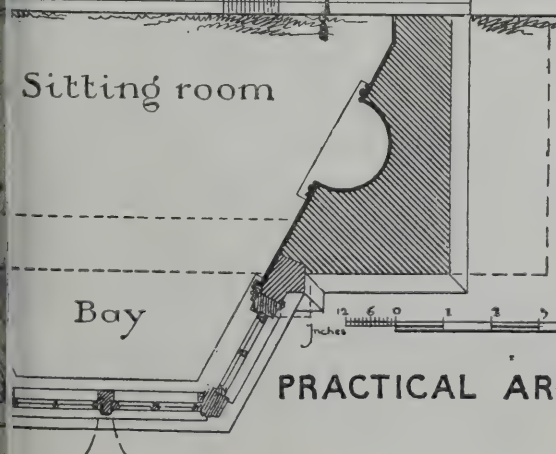


# STABLES AND COACHMAN'S HOUSE N°10

Working Drawings Maurice B. Adams FRIBA  
Architect

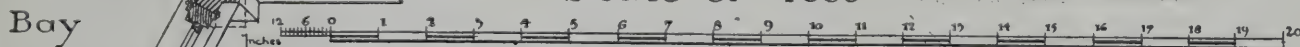


Side



Section of Gable

Scale of feet





## THE ART CONGRESS AT LIVERPOOL.

**D**URING the present week the National Association for the Promotion of Art is holding its first congress at Liverpool. The inaugural address was given at St. George's Hall on Monday evening by the president, Sir Frederic Leighton, P.R.A. He complained that with the great majority of Englishmen the appreciation of art, as art, was blunt, superficial, desultory, and spasmodic; our countrymen had no adequate perception of the place of art as an element of national greatness; they did not count its achievements among the sources of their national pride; they did not appreciate its vital importance in the present day to certain branches of national prosperity, and the æsthetic consciousness was not with them a living force, impelling them towards the beautiful and rebelling against the unsightly. In this country there was little adequate consciousness that every product of men's hands claiming to rank as a work of art was a work of art only in proportion as it contained within itself divine fire and the germ of living beauty; and the presence of this divine germ ennobled every creation which revealed it. Having referred to the influence of art among the ancient Greeks, and the Italians, French, and Japanese of modern times, Sir Frederic said that with the mass of our own countrymen the weakness of the critical faculty in æsthetic matters, and the curious bluntness of their perceptions, was seen over the whole artistic field. As an example of the indifference to the disfigurement of our towns, he instanced the National Gallery, which was rising steadily to a foremost place amongst the famous Galleries of the world. As the final outcome of a movement for the enlargement of the building, the original edifice remained unaltered as to its exterior; but in the rear of one of its flanks there now loomed into view, first, an appendage in an entirely different style, and, further on, an excrescence of no style of architecture at all. The one was an Italian tower, the other a flat cone of glass, surmounted by a ventilator, of the warehouse type, the whole resulting in a jarring jumble, and an aspect of chaotic incongruity, which would be ludicrous if it were not distressing. Now, he had never heard one single word of articulate public reprobation levelled at this now irremediable blot on what we so complacently call the finest site in the world. In regard to sculpture, the public apathy and blindness were yet more depressing and complete. In the appreciation of painting the same shortcomings were evident, though in a less degree, and with less mischievous results. He believed the day would come when public opinion would make itself loudly heard; when men would insist that what they did for the gracing and adornment of their homes should be done also for the public buildings and thoroughfares of their cities, and would ask why the walls of our public edifices were blank and silent, instead of being adorned and made delightful with things beautiful to see or eloquent of whatever great deeds or good work enriched or honoured the annals of the places of our birth; and he believed that an art desired by the whole people, and fostered by the whole people's desire, would reflect some of the best qualities of our race—its love of nature, its imaginative force, its healthfulness, and its strong simplicity.

On Tuesday, Mr. G. Aitchison, A.R.A., delivered the Presidential Address in the section of Architecture. He said there were only two sections of mankind that were content to exist without architecture—the lowest savages and those who were in most respects the most highly civilised. The former were contented with caves, while the latter only asked for buildings that met their more complex physical wants, but were destitute of everything that appealed to their highest nature. When architecture was loved it would be paid for, and architects would get as many pounds as they now did shillings. This had been the case with painting. When a higher appreciation of what was true and noble in life, would follow a more genuine delight in, and love for, those arts which elevated the world.

The section of Applied Art was presided over by Mr. Walter Crane. A paper was read by Mr. G. H. Garraway, describing the *modus operandi* of the Liverpool Art Workers' Guild, and one by Mr. H. B. Bare, of Liverpool,

advocating the creation of a school for artistic handicrafts. In the Painting section Mr. James Towers read a paper on "The Encouragement of Local Art," and Mr. James Patterson another on "The Cultivation of the Love of Art."

In the Sculpture section Mr. Alfred Gilbert, A.R.A., presided, and read a letter from Mr. G. F. Watts, R.A., who gave a somewhat melancholy review of the condition of Art at the present. The instinct of joy in beauty, he said, was coming to an end, crushed by the wheels of machinery, and forgotten in the competition for wealth. The stumbling block of the English was the practical; and till the love of beauty was revived there was little hope for Art. Mr. G. Simonds read a paper on the "Importance of Sculpture in Civilisation."

Mr. L. Alma Tadema, R.A., delivered his address as President of the Painting section. He said the artist's highest aim and necessity were to convey to his fellow-creatures the impressions of beauty which he was constantly receiving, and which dominated his life. Everyone who tried to share with his fellow-creatures the sentiments that filled his soul would be rewarded by grateful sympathy in proportion to the impression of beauty he was able to convey. Sculpture was no longer the leading art as it undoubtedly was in antiquity. It was a distinguishing feature of our age that we sought human individuality rather than symbol, and symbol being the soul of sculpture, its loss was detrimental to the art. This was well exemplified by the greater part of our monumental statuary, for, instead of an emblematic and suggestive figure, we were now given a realistic and substantial impersonation of the man whose mind and deeds we desired to honour. That the grandeur of art had suffered by this was undeniable; but in all other senses art had been developed by this universal spreading of its influence. Landscape painting, above all—an essentially modern branch of pictorial art—owed its development, if not its existence, to this state of things.

On Wednesday Mr. Walter Crane delivered his presidential address in the Applied Art Section. He pointed out the difficulty which art experienced in finding a place for the sole of her feet in these days of industrial pressure. Mechanical ingenuity had taken the place of art because, in the great tide of commercial enterprise, the amount of the output was more regarded than the artistic quality of the material or work. The spirit which ruled industry now was wrapped up in the one object of the salesman to sell. The spirit of the artist was not merely to produce, but to express something which was a joy in the making, and might be a joy to the beholder.

In the Architecture section, which was presided over by Professor Aitchison, "Style in Architecture" was the subject of a paper read by Mr. Basil Champneys, who said the development of style had been gradual and harmonious, and its practice had been the result neither of theory nor argument. But in the present day the architect found himself unaided by any prevailing taste or tendency. The best means of remedying that state of things, and for bringing architects generally to some common aim, would be to limit their study to English work, to lead them to prefer purity of style to mere extravagance and originality. If the Gothic style of architecture could be as successfully developed in domestic architecture as it had been in their church architecture, there would be more hope of a better and a more harmonious style in the future. In the same section Mr. T. G. Jackson alluded to some obstacles opposed to the progress of architecture by architects themselves. He said, considering the importance of good architecture, it was astonishing to find such general indifference among the public. The remedy was in the hands of architects themselves, who were by no means working in such a way as to put their best work before the public. The only architect deserving that name was the man who attended to the smallest detail of his design and work. Unless architects devoted themselves entirely to their own craft they could never hope to do good work.

Mr. L. Alma-Tadema presided in the Painting Section, where Mr. F. Bate read a paper on "The Tendencies of Modern Art." He advocated a more thorough and intimate relation between artists and workmen. In the applied

arts artists who did not know the technical detail of work were at a great disadvantage, and so with workmen who had no knowledge of art. To remedy this, artists and workmen alike should be educated together in one common school, so that each would know the work of the other. The Royal Academy had left unfulfilled the duties for the performance of which it was originally founded. It had educated a ridiculously small number of people, and we found art students seeking their education, not in the school of the Academy, which did not rank high enough, but in various Continental schools. The Academy withheld encouragement from water-colour painters and engravers, everything having been sacrificed to the interests of painters in oil. The Academy, in fact, had shown itself unfair, illiberal, and narrow-minded.

The Chairman defended the Academy from these strictures, remarking that Sir John Millais, the late Frank Holl, and many others of the widest reputation, were all pupils and medallists of the Royal Academy, and had not had to go abroad for their education.

In the Museum Section, Mr. W. C. Quilter, M.P., presiding, Mr. Whitworth Wallace, Curator of the Birmingham Museum, and Mr. J. Pyke Thompson, of Cardiff, read papers advocating the Sunday opening of museums; against which Archdeacon Lefroy protested strongly. The majority of the audience, however, was evidently in favour of it.

Mr. Holman Hunt read a paper on "Art Education," in which he commented on the inadequate support given by English Governments and by the English nobility to art, and Mr. Wm. Morris delivered an address on "Art and its Producers."

## THE MAINTENANCE OF MACADAMISED ROADS.\*

By W. HEWITT.

(Continued from p. 728.)

**C**INDERS and slag form a very good foundation when obtainable, as does coarse gravel. In some districts, where stone is scarce, burnt clay is used; but for ordinary roads the foundation is most generally formed of rough stone, often of spalls from the nearest quarry. Whatever the foundation is it should be well rolled before the surface metalling is laid. Oftentimes the metalling is laid direct on the formation surface. The generality of existing roads are formed in this way, but it is not well to do so if it can be avoided, and the practice is much to be condemned. In some cases, when a road is made on wet, boggy ground, a layer of fascines is laid first, to form a firm foundation, and then the road is formed on it; but unless the nature of the ground is such as will always insure the fascines being kept in a wet or damp state, they will soon rot, and the road will go to pieces. Therefore they should never be used, unless under unavoidable circumstances. In some districts the foundation is formed of chalk; but this should not be used unless it can be thoroughly protected from the action of wet and frost, owing to its power of absorbing water, which causes it to turn into mud in wet weather, and to blow up in frost. Stiff clay is a bad foundation, owing to its great contraction in dry weather and expansion in wet. When the foundation is laid, whatever course may be adopted, the metalling, if more than 4 in. or 5 in. in thickness, should be laid in two layers, each rolled separately, if rolled, as is frequently the case, with a heavy roller only. When two rollers can be used, one light and one heavy, the better course will be to roll it all in one layer, passing the light roller over first, and finishing with the heavy one. The top layer, when partly consolidated by rolling, should have a binding material laid over the surface and rolled in with the metalling to form a compact mass, and while this is being rolled it should be well watered. It is better, in making a new road, to roll the surface, although the metalling is left in many places to consolidate by the traffic; but in such a case a great deal of material is wasted by grinding and crushing, besides causing great inconvenience to the traffic, and the metalling also wears round and takes a long

\* Read at the Ordinary General Meeting of the Surveyors' Institution, Nov. 26, 1888.



time to set. Rolling is only necessary in the case of new roads, or when a thick coat of metalling is laid. When a thin coat is rolled the roller generally smashes a great deal of the stone, which would not be the case if it were consolidated by the traffic. Steam-rolling is better and more economical than horse-rolling, as it more thoroughly and quickly consolidates the metalling. With a heavily-weighted horse-roller the stones are much displaced by the horses' feet, in consequence of the great exertion necessary to draw it. Horse-rollers are very unwieldy in use, and are now seldom used anywhere. When rolling is resorted to in repairing a road, it is sometimes necessary to stock the surface of it. This should not be more than half an inch deep, as deeper than that displaces the old metalling and increases the cost, with no corresponding advantage. The metalling should be carefully spread and of a uniform thickness, and the binding material applied when about half-rolled. The binding is very often applied too soon, and in too great a quantity, the consequence being that the road is soft and muddy, and does not get firm until the superfluous small stuff is squeezed out and removed in the form of mud or dust by continued scraping and sweeping. The proper quantity of binding material which it is necessary to use is, in my opinion, as little as possible. Clean, sharp sand, or fine gravel, is generally used as a binding material, but, as nearly all stone where rolling is resorted to is broken by machinery, I think the screenings from that are much the best material for such a purpose, and being of the same nature as the metalling will unite with it and form a hard close surface much better than with sand or gravel, which are of a foreign nature, and not being angular like the screenings, will not set so readily. With a silicious material, limestone screenings will cause it to set better than anything else. In all cases the screenings should be of the same material as the road metal. When using a binding material the fact is too often lost sight of that it is only intended to fill up the interstices between the larger stones, and when more than sufficient for this purpose is used, the bad effects before mentioned always ensue. There is no economy in repairing a road with thick coats, and rolling, unless the traffic is very considerable, although there is a great deal more comfort to the public, owing to the easier draught; there will, moreover, be much less wear and tear of vehicles. A weak road should not be rolled, as although the weight of a 15-ton steam roller is very evenly distributed over the surface, and the weight is not great per inch of width, it would be likely to be very injurious to the road, owing to causes which will be mentioned further on. When once a road is coated and rolled it is too often the case that it is left to take care of itself, except for scraping and sweeping, until it requires coating again. For some time before this is done the surface is covered with depressions, which are frequently of such a depth as to be dangerous. The coating would generally last much longer if, as soon as any hollow made its appearance, it were filled up with small-sized metalling. A proper system of repairing by small patches will in all cases result in a great saving. One of the great causes of slacks or hollows appearing in the surface of a newly-rolled road is that the metalling has not been uniformly spread. When they appear during rolling, they should be filled with metalling broken to a rather smaller gauge than the rest. The road should be carefully watched after the rolling is completed, and, if any hollows should appear then, they should be immediately covered with small patches of stone. Stone for patching should always be broken to a rather smaller gauge than for coating. Too great stress can hardly be laid on repairs by patching—a matter very imperfectly understood by a great many highway surveyors, and in some towns never practised at all. Roads and streets have come under my notice where little or nothing is done to them until they require coating, and so coat after coat has been laid until the top metalling is 2 to 15 in. thick on roads with only light traffic. By this means, the roads have been so raised that they are in the centre considerably above the level of the de-walks, and have a sharp and frequently

dangerous fall towards the sides. The materials used for road-metalling must of necessity vary very much according to locality. Owing to the cost of haulage, local stone must generally be used, especially if the traffic be only moderate. If, however, the traffic is heavy, it will sometimes be found better and more economical to obtain a superior material, even at a higher cost; and, in cases where the traffic is very great, the best material that can be obtained is the most economical. In some cases the better material may be used on those parts of the road where the traffic is greatest, and, in other cases, in the centre of the road only. A good road metal should be hard and tough, and if it has a certain amount of binding nature in it so much the better. It should also be able to withstand the influences of the weather. These qualities are seldom found together; as igneous and silicious rocks, although frequently hard and tough, do not consolidate so well nor so quickly as limestone, owing to the sandy detritus formed by the two first having no cohesion, whilst the limestone has a detritus which acts like mortar in binding the stones together. A stone of a good binding nature will frequently wear much better than one without, although it is not so hard. A limestone road of good cross-section will be more impervious to wet than any other, owing to this cause, and will not disintegrate so soon in dry weather, owing partly to this and partly to the well-known quality which all limestone has of absorbing moisture from the atmosphere. The limestones are generally not hard enough for roads with very heavy traffic, where hardness and toughness are of more consequence than any other properties. For such roads the best materials are some of the granites, such as Guernsey, Penmaenmawr, and Cornish; Cleve Hill stone, traps, basalts, whinstones, and some of the silicious rocks. For roads of moderate traffic the best are the harder limestones and a hard sandstone sometimes found in the coal measures. Iron and copper slag are sometimes used, but, although very hard and tough, have no binding property at all, and the edges of the pieces when broken are so sharp as to cut horses' feet very badly. In some parts gravel is used very largely for road metal. It should be well sifted from small material, and the large stones broken down to the proper gauge. Field stone and river stone are much used in some districts, but generally make a rough road, as they are composed of the hardest parts of those stones which have resisted the action of the weather, and are, though frequently very hard, of unequal hardness, so that they wear very irregularly. Mere hardness without toughness is not of much use, as a stone may be very hard but so brittle as to be crushed to powder under a heavy load, when a stone not so hard, but having a greater degree of toughness, will be uninjured. The size to which surface metalling is generally broken is such that a stone in its largest dimensions will pass easily through a ring either of 2½ or 2¼ in. diameter. For roads where the traffic is light it may be advantageously broken smaller, as it will then cover a larger space, consolidate much more quickly, and make a smoother surface. When the material is rolled it need not be broken quite so small, as when it is set at once by rolling it is an advantage to have a rather larger stone, as it makes a stronger road. Great care should be taken in the preparation of the material, so that the stones shall not be long, flat, or flaky; the small stuff should not be screened from it when hand-broken, as there is generally no more than what is useful. All clay and dirt should be separated from it, except in the case of gravel, when a certain proportion is necessary, for if gravel is too clean it will not set for a long time, owing to there being no many round stones in it. The stones should, within certain limits, be kept as nearly as possible of a uniform size and a cubical form, as they then make a better and more even road. Stone broken by hand is preferable to that broken by machinery, as machine-broken stone is not so durable as hand-broken. When broken by a machine it is always crushed to a certain extent by the jaws, and therefore does not wear so well, especially under heavy traffic; but when a machine can be kept in constant use it is often cheaper, especially if the stone is very hard: with some hard stones the cost will often be

found to be only about half that of hand-breaking. A hard stone which is not tough and some of the softer stones will be crushed to powder by a machine. Machine-broken stone is also frequently very flaky, which is a great disadvantage in setting. In stone broken to a gauge of 2¼ in. the proportion of solid is 55 per cent. to 45 per cent. of void; therefore, taking the average weight of a cubic foot of solid limestone to be 170 lb., the weight of a cubic yard of broken metalling would be 1 ton 2 cwt. 2 qrs. 4 lb. This, when consolidated, would weigh nearly as heavy as the solid stone—in fact, a cubic foot of consolidated road metal weighs on an average from 93 to 95 per cent. of an equal bulk of solid stone; therefore, it takes 1½ of broken material to form 1 of road, or, in other words, when the metalling is consolidated it occupies two-thirds of the space it did before. The interstices in the road coating are filled with small stones and mud; these form a great portion of all roads. In a consolidated road the amount of metalling over ¾ths of an inch varies from 20 to 55 per cent., and the mud from 20 to 25 per cent.; the remainder consists of small stone which is very useful in the road. In a road freshly coated, of course the proportion of large stone would be greater. Generally speaking, the road which contains the greatest quantity of large stone will be the best; but sometimes such a road, from having an ill-drained foundation, will be very weak, and large quantities of stone may be put down without materially strengthening it, and the stones will always work about in wet weather. An excess of mud should not be allowed to accumulate, as few things tend to weaken a road so much; any road containing more than is absolutely needful should be constantly scraped until it is reduced to the proper quantity. The chief causes of wear on roads are the action of the traffic and the action of the weather. The relative wear of each cannot be accurately told, as the one helps the other so much, and they vary according to local circumstances. On a strong consolidated road the greatest wear arises from the action of the horses' feet and the wheels of vehicles, and the smoother the road is the less the wear will be, as in a rough road, in addition to the downward pressure, there will be that pressure on every projecting stone which will tend to push it forward, and so cause a grinding movement between the stones. This pressure is greater in proportion as the diameter of the wheel is smaller, and is much more destructive than the vertical pressure. When the material is not thoroughly set this grinding movement is still more destructive and causes great wear and waste of material. On weak or ill-drained roads great wear is caused by bending and cross-breaking. When this takes place there is a yielding of the subsoil, as well as of the road coating; the road bulges and cracks under the weight of the load, the metalling is driven into the subsoil at the point of contact with the wheel, and that surrounding it rises above the level of the road; the surface water finds its way in through the cracks and weakens the road still more, and in frosty weather the frost gets in, and when the thaw comes the road is blown up in a great many places, and wet boggy places are formed which are very dangerous. Besides this, the draught is very much increased on such a road, owing to the surface bulging before the wheels, and a horse is therefore, on a level road, continually pulling the road uphill. Along the sides of the ruts may be seen cracks, which lead directly to the subsoil. The wear caused by the wheels of vehicles is influenced very much both by their diameter and width. It has been said by some that the resistance to traction on a road is in inverse proportion to the square root of the diameter of the wheel. Others say it varies inversely as the diameter. From experiments made with Easton and Anderson's horse dynamometer at the Royal Agricultural Show, 1874, a slightly greater ratio than inversely as the diameter was given, and I am inclined to think that inversely as the diameter is the more correct view of the two. There can, however, be no possible doubt but that large wheels are much more favourable both to draught and wear of the road than small ones. The draught is always much less on a smooth, hard, unyielding road; a flexible, yielding road, although it may be elastic, will not give back the force expended in the pressure of a wheel on it, and



this force must naturally be more on a yielding than on a hard road. Of the width of a wheel it may be said that, up to a certain limit, a broad wheel with the same load is less destructive to a road than a narrow one in about the following proportion—not, I believe, as is generally thought, in the direct ratio of its width. In practice, I think, a wheel 2in. wide will be found to be nearly one and a half times as favourable to the road as a wheel 1in. wide, a wheel 3in. wide nearly twice as favourable, and a wheel 4in. wide two to two and a half times as favourable. This will vary more or less under different circumstances, but will be found, I believe, to be about the correct proportions. My reasons for so thinking will be found in the theory explained in the next paragraph. Practically, no advantage is gained by having wheels more than 4½in. wide. Sir J. Macadam said that the maximum load which should be allowed on any vehicle should be 9cwt. per inch of width of tire; Telford and Sir J. Macneill contended that 5cwt. was the greatest load that should be allowed, and I think their view is the more correct one, as few roads, except in large towns, are strong enough to bear such heavy loads as 9cwt. per inch continually passing over them. Broad wheels loaded in the same proportion as narrow ones are much more destructive than narrow ones. A road which will bear a considerable load on narrow tires will sometimes break down under the weight of a traction engine, although the pressure per inch of width of tire may be much less. I think the explanation of this may be found in the following theory:—If we take a wheel 1in. wide and suppose that at the point of contact with the road surface (which we will suppose for the sake of illustration consists of spheres 1in. in diameter) it presses on a sphere and that sphere on four others, and so on in a pyramidal form, it will be found that the weight is distributed over a much larger area of the subsoil than the surface it comes in contact with. Now take a wheel 4in. in width, and suppose it rests on four spheres placed in a row, each 1in. in diameter, it will be evident that each sphere cannot rest on four independent spheres, and each pyramid will, therefore, be composed of parts of other pyramids, which intersect each other. With a 1in. wheel the sphere would rest on four others immediately supporting it, and the four spheres in a row under the 4in. wheel would rest on ten; at the same depth four separate 1in. wheels would rest on sixteen spheres, as against the ten supporting the one 4in. wheel, and the lower we go the greater becomes the proportion in favour of the 1in. wheels. Therefore, the greater the width of the wheel, loaded in the same proportion, the greater will be the pressure on the subsoil immediately under it, as the load is always borne by the subsoil and not by the road coating, which is merely a hard surface formed to protect the subsoil from the immediate effects of the traffic. Of course, this will be greatly modified in practice, owing to the different sizes and shapes and nature of the actual road coating. It may, therefore, I think, be laid down that broad wheels with the same load are much less destructive than narrow ones, but broad wheels loaded in the same proportion per inch of width as narrow ones are much more destructive. The best shape for a wheel is cylindrical; dished wheels should never be used, as, owing to their shape, their line of direction is not the same as the line of draught, consequently a lateral motion is caused, which is a source of great injury to the surface of the road, especially in dry weather, and they also increase the draught. Wheels with tires the section of which is the segment of a circle are also to be condemned. In fact, all wheels which are not cylindrical have disadvantages for which they have no proportionate compensation. The effect of springs is more noticeable with vehicles going at a high rate of speed than when at a walking pace—in fact, when walking, the draught is very little less than without springs: at higher rates of speed the draught is much less. This applies to a smooth, hard road; on a soft, yielding surface the good effect of springs is considerably lessened. The weather has a considerable effect on the wear of roads, not so much directly as indirectly, by increasing the wear caused by this traffic. Excessive wet causes great wear by softening the binding in

the road coating, which destroys the solidity of it and causes great wear by the material rubbing together, and makes it less able to support the traffic. Frost after wet causes great injury. The water in the road, and sometimes in the material itself, when frozen, bursts the road coating, especially if the foundation is wet, and when a thaw comes the road becomes rotten, and much damage is sometimes caused by heavy traffic coming on a road at such a time. Rain after thaw also causes great injury, and when alternations of frost and thaw occur the road is tried very much; indeed, a good road will sometimes break up under such conditions. If the foundation is wet, and the frost reaches through to it, the road will be blown up from the bottom. Excessively dry weather causes great wear, especially with a silicious road material, by the small stuff and mud being loosened; but this can always be counteracted by watering. Dry weather has less effect on limestone than on any other road material. Trees and high hedges are also a great cause of wear by keeping the sun away, the road remaining wet where otherwise it would be dry. Wear is less, generally, in proportion as a road is smooth, strong, and well drained, and of a sufficient width to accommodate the traffic freely. Many experiments have been made to measure the wear on roads; but this can only approximately be done, unless the area and quantity of material periodically laid are known. Some say that the wear increases in direct proportion to the traffic, others that it increases in a greater ratio; but from personal observation, I think that, on a road where the traffic is very heavy, the latter idea is frequently correct. The amount of material expended annually in this country on main roads varies from about 40 cubic yards per mile in remote country districts to 1,000, and sometimes 1,500, cubic yards in the vicinity of large towns; but I think the general average would be from 70 to 80 cubic yards per mile. On district and parish roads it is frequently as low as 10 cubic yards per mile. A great mistake is often made in country districts where there is little traffic, in procuring a very hard stone from a distance, when a moderately hard one can be obtained in the immediate neighbourhood, and at a very much less cost. The hardest stone is not always the best for a road; it is only the best when the traffic is great. On a road where there is only light traffic a softer stone is much to be preferred, because the hard stones do not consolidate under the traffic, and the road is always rough and uneven. I have seen this in many cases, to make the matter worse, where a quantity of road scrapings was put on in the spring to make the stones set. When the wet weather came, this was all squeezed out as mud, and had to be scraped off again, causing great inconvenience to the traffic and costing altogether about twice as much as the local stone would have done. Where roads are repaired by thin coats without rolling, as all country roads must be, on account of the small quantity of stone used per mile, great care is necessary that none of the material is wasted. When the material is laid in the proper season—viz., in the late autumn or early winter, it soon consolidates under the traffic and forms a smooth surface. All the stone should be laid before Christmas, except a small quantity which should be kept for the necessary patching in the spring. The coat should never be more than one stone thick; if it is necessary to put a greater thickness, one coat should be laid, and, when nearly consolidated, another should be laid on the top; by this means a much firmer and harder road is formed, and with less waste of material; but, when it can be avoided, a road should never be left to get so much out of shape as to require a greater thickness of metalling than one stone thick. Before coating a road is commenced in the autumn all the small hollows should be patched, which will prevent them wearing larger; then those portions of the road which require coating should be done. It is always best to lay the coatings in short pieces, as if a long length is laid the traffic goes to the side of the road to escape the stones, and frequently cuts it up very much, whereas when laid in short lengths it is not worth while to go to the side to do so, as they are so soon passed over; if a long length of road require coating it should be done in that way, and when the short coatings are worn in, which will not take long

in the winter, intermediate coats may be laid. When the metalling is laid it should be constantly attended to, and raked so as to prevent the formation of ruts. Generally speaking, there is no advantage in stocking a road when repaired in this way; it may sometimes be necessary to do so slightly when the metalling is laid in a dry season, but this will always depend on circumstances. Ruts are best repaired by filling in the wheel tracks first, and when the material is partly set the centre rut should be attended to; this is better than doing all three at once, or the centre and one side first, as in the former instance intermediate ruts are soon formed by the traffic avoiding the loose stones, and in the latter the traffic all goes to one side, where's if the two outside ruts are filled in first, the traffic keeps to the usual line, on account of having the horse pad clear, and when it is time to repair this rut the traffic soon wears the single line of stone in. If it should be necessary to lay a large coating on a street or road with heavy traffic, a binding material may be advantageously used; but, as a rule, a firmer road is formed without it. It is essential that the superfluous mud be removed from a road. This may be done by sweeping or scraping where it is in the form of either mud or dust. When dust is regularly removed from a road it does not require nearly so much watering in dry weather as it otherwise would; care must be taken, however, in a road composed of silicious materials that the road is not damaged by too much sweeping, as it will tend to disintegrate the surface, and a great deal of useful material is liable to be swept away. The best time for sweeping is early in the morning before the dew has dried, and there is much less inconvenience to the traffic at that time. Machines drawn by horses are sometimes used to sweep up mud or dust. The most common form is a circular revolving brush, mounted obliquely, which sweeps the mud or dust in a line on the one side, to be afterwards gathered up. Another machine often used is a scraping machine, constructed in an oblique manner also, and which acts in a similar fashion. This is very useful when the mud is partly dry. The most useful machine that I have seen is Warren's. In this machine a series of brushes attached to an endless chain revolves as it is drawn along, and sweeps the mud up an inclined plane into a mud-cart, to which it is attached. When this cart is full it can be removed and hauled away, and an empty cart attached, so that the machine is kept constantly at work. Some surveyors object to this machine on the ground that it removes too much of the useful small material, about the size of small shot, from the road. It does do so to a certain extent, but this can be reduced to a minimum by adjusting the pressure of the brushes, which is easily done by simply turning a small wheel; but the amount of small stuff that this machine removes is so little more than the ordinary kins do, that it is much more than compensated for by the great saving in time and labour, besides more effectually cleaning the road. The great advantage of this machine is that it removes the mud quickly and at once from the road, and does not interfere with the traffic while doing so. These machines can only be advantageously used in or near towns, and where there is great traffic. In the country, hand scrapers and brooms are mostly used, but a small scraping machine which can be used by one man is of great advantage. The best way to use it is from side to side, as this tends to preserve the cross-section of the road. A man can scrape a great deal more in a day with one of these machines than with a hand scraper, and do the work much better. It is said by some to be very injurious to remove mud from a road when it is at all dry, but in most cases it is better for the road that it should be removed. A road should never be watered unless it really needs it, as too much water is very injurious and increases the wear from traffic. To insure the constant attention that a road always requires, it should be divided into lengths, each under the charge of a constant labourer. As much should be given to each man as will keep him constantly employed during the summer, and he will be able to do all the necessary work at other times with the assistance of casual labourers. The length of road apportioned to each man will, of course, vary much according



circumstances. On main roads from one to two miles on a road with heavy traffic, to six and in some cases eight or nine miles on roads with light traffic. On parish roads these lengths may in some cases be longer. The constant labourer should be on his road at all times, wet or dry, and it is of great importance that he should be there during heavy rain and storms so as to see that all drains and watercourses are clear, as great damage is frequently done to a road by their being choked, particularly in hilly districts, where a great amount of rubbish is usually brought down at the commencement of a storm. The constant labourer should have entire charge of his length under the surveyor. He should not have his work set by the piece, as piecework is seldom so well done as daywork, and he should not be moved from his length to another without good cause, as nothing causes a man to lose interest in his work so much as removing him when he has succeeded in getting his length into fair order. Some men can never be made good roadmen, while others acquire the necessary knowledge and skill very quickly, and will do more work and make the material go farther than others who have been at similar work for many years. It is generally much better to employ such men as these, even if paid a little more money, as it will be far more economical than employing the first man who applies for the work, as very frequently done, because he will work for less money. This system of employing constant labourers has been in use on the South Wales county roads for the past 40 years and has been found to work very effectually; it has also been adopted in several parts of England during the past few years. I think it is a great mistake to let road repairs by contract—the work is never so efficiently done as would be by daywork with men in charge of skilled labourer, and when under the supervision of a surveyor. The only thing which can be advantageously let by contract is the supply of road materials, which may be supplied, ready broken, in heaps on the side of the road, or, better still, in stone depôts recessed in the hedge or bank. It is better to have the material in small heaps, at short intervals, so that it can be wheeled out with a wheelbarrow, rather than have large heaps at long intervals and have to cart it where it is wanted; the men usually make the material go farther in pairing and patching if accessible with wheelbarrows. It is best to have it supplied by the cubic yard rather than by the ton, and it should not be measured until broken and stacked. It could always be delivered by the end of the summer, as the road is less injured by the riding at that time, and the longer the road is exposed to the action of the weather the better it is. If the repairs should be let by contract, the term should not be for less than three years, as if let for a shorter period, in this, one man may keep the road in good repair for one year, and use a proper quantity of material and labour on it; the next year another man may get the contract, and do as little as he possibly can to it, just keeping it in good appearance until his contract expires, and then, as soon as wet weather comes, the road shows great signs of weakness, and requires a great deal of material and labour expended on it to bring it into good order again.

(To be continued.)

#### A COMPREHENSIVE GUIDE TO NORTHUMBERLAND.\*

THIS new work well deserves the distinctive adjective by which Mr. Tomlinson has preceded his title, and will be welcomed by the increasingly large class who demand books of reference, and especially by those connected with the most northern county of England. The style of the new guide is more diffuse than that of the familiar handbooks of Murray, extra space being allotted to the consideration of historical and antiquarian subjects, and especially the folk-lore and ballads of Northumberland. The padding is in places perhaps palpable; but the outcome is a work which will be found readable even by those who have local sympathies to be awakened by its title, and wherever we have tested it the in-

\* A Comprehensive Guide to Northumberland. By W. TOMLINSON. London: Walter Scott, 24, Warwick Lane, E.C.

formation appears reliable and brought down to date. The compiler has frequently utilised the labours of recent writers on the archaeology and topography of the county, and expresses his indebtedness to Mr. C. C. Hodges, of Hexham, and to Dr. J. C. Bruce for information as to the churches and the Roman Wall respectively. The county is divided into ten sections, each treated in a separate chapter. A few introductory pages deal with the geology, history, and characteristics of Northumberland as a whole, and a useful appendix furnishes tabulated statements as to the styles of the pre-Reformation churches, only seventy-eight in number, the ancient parishes having been of immense extent, the British and Roman camps, of which there remain 36 and 22 respectively, the castles and pele towers, and the remains of monastic houses. One large and three sectional maps of the county are other excellent features of the book, which is well got up and, like Continental guides, is bound in scarlet cloth with rounded edges to the corners.

#### BOOKS RECEIVED.

*A Memorial of the Cambridge Camden Society and the Ecclesiological Society*, by the Rev. E. J. BOYCE, M.A., Rector of Haughton, Hants. These societies, which were really successive phases of one and the same organisation, were coincident with and marked symptoms of the Gothic Revival, and have found an historian in Mr. Boyce. The Camden Society was founded in 1839 at Cambridge, as a University movement, and gradually became nationalised as its members left their colleges; it was dissolved in 1845 owing to the withdrawals of those who feared that its tendencies would be towards Roman Catholicism. Many of its members reconstituted it as the Ecclesiological Society in the following year, but it finally ceased to exist in 1868. The society, under its successive titles, initiated and aided in carrying out many important church restorations, and was a factor in setting the tide of public opinion and subscription in that direction; they also published very valuable papers in the Transactions, and although the dispassionate observer sees that they made many errors of commission, they induced the public to treat the fabrics of the churches with greater care, and played no unimportant part in the ecclesiastical, theological, and architectural movements of the Early Victorian period.—*Notes on Technical Education*, addressed to the Gaekwar of Baroda, by R. F. CHISHOLM, F.R.I.B.A., suggests a scheme for the Workmen's Institute just established at Baroda, based on Mr. Chisholm's experience in the pottery and other industries.

—*Wilson's Advanced Building Construction* (John Heywood, Manchester and London) is a compilation that will be highly valued by all artisans and students who are engaged in the study of building construction. The elementary work on this subject we noticed some time since. The course of lessons is graduated, and includes every trade. The author is the lecturer on Building Construction in the Technical School, Manchester. His large experience of teaching has enabled him to give the most important kinds of construction. Thus in the present book the strength of wood and iron girders is treated in a number of worked examples, each step of which is rendered easy. To the teacher Mr. Wilson's useful work will be equally serviceable. The details are drawn to a working scale, and are very clear. Iron roofs are treated. The exercises on practical arithmetic and the mode of calculating the strength of beams are particularly of value to the student.—*Graphic Statics and Practical Arithmetic for the Honours Stage*, by the same author, contains a very ably-compiled series of exercises, showing the application of the valuable principle of graphic statics to various kinds of construction—gates, doors, partitions, roofs, &c. The book is useful for those competing for the Associateship of the Institute. This work can be obtained direct from the author, John Wilson, Chapel-grove, Urmston, near Manchester.—*Electric Bells and All about Them*, by S. R. BOTTONE (Whittaker and Co., Paternoster-square), is a new work by an old contributor to the *English Mechanic*. The author gives full details as to the construction of batteries, bells, pushes and detectors, the

modes of wiring, testing, connecting-up, and localising faults. It contains more than a hundred illustrations. No bell-fitter should be without it.—*The Application of Ornament*, by LEWIS F. DAY (B. T. Batsford, 52, High Holborn), is the last of a series of three textbooks on ornamental design. The two earlier volumes dealt with the anatomy and planning of ornament respectively, and explained the theory of the rudimentary lines on which decoration may be designed and distributed. The present book shows the place, purpose, and process of application, the keynote struck being that strict subordination to practical conditions is the first essential to ornamentation. Important chapters are those dealing with the rationale of the conventionals, and where to stop in ornament. The volume is illustrated by over fifty phototints.

#### THE LATE MR. C. F. HANSOM.

WE regret to announce the death of Mr. Charles Francis Hansom, architect, of Bristol, which occurred at his residence, 1, Claremont-place, Clifton, on Friday last, at the age of 72 years, the immediate cause of death being cancer. Mr. Hansom, who was one of the last survivors of the pioneers of the Gothic Revival, had carried out a very large number of churches, schools, and convents for the Roman Catholics, chiefly in the Decorated style, and all thoroughly English in character and treatment. He was a younger brother of the late Joseph Stanislaus Hansom, who died in 1882, also an ecclesiastical architect, but more widely known as the inventor of the cab which bears his name; the brothers were in partnership from 1854 to 1859, and since September, 1886, Mr. C. F. Hansom has been associated in business with Mr. F. Bligh Bond, a former pupil. He leaves a widow and one son, Mr. E. J. Hansom, formerly in partnership with him, but now of the firm of Dunn and Hansom, of Newcastle-on-Tyne.

Among Mr. Hansom's chief works may be named the Pro-Cathedral at Clifton; Roman Catholic churches at Erdington, Coventry, Edgell, Wolverhampton, Bath (St. John), Rugeley, Thurnham, Appleforth, Cardiff, Cheltenham (St. Gregory), and elsewhere, in all about seventy in number; convents at Stone, Stoke-on-Trent, Clifton, Loughborough, and Taunton; colleges at Clifton (which is about to be completed from his designs), Malvern, and Tavistock (Kelly Memorial), and designs prepared for Bristol Medical School. For the Bristol School Board, Messrs. Hansom and Bond have built Easton-road schools, another at Ashton Gate is in progress, and on the day of Mr. Hansom's death the Board adopted modified designs on which he had been at work to the last for a third school in Anvil-street. For the last three-and-twenty years he had been a Fellow of the R.I.B.A., and he took an active part in the formation and working of the Bristol Society of Architects, of which at the time of his death he was president. He also assisted in the establishment of the local Artillery Volunteer Corps, in which he held a captain's commission. Mr. Hansom was buried on Tuesday at the Catholic Cemetery at Bath, at the special request of St. John's clergy in that city, the cemetery having been laid out, and the Eyre mortuary chapel within it built, from his designs. The funeral was attended by Mrs. Hansom, his son, and other relatives, and by the vice-presidents and a dozen other members of the Bristol Society of Architects, besides other professional brethren.

The Highways and Sewerage Committee of the borough of Leicester, at their meeting of Friday last, decided to appoint, subject to the approval of the Town Council, Mr. Chas. Mason, deputy borough engineer of Nottingham, to the post of assistant borough surveyor of Leicester. Mr. Mason is an Associate Member of the Institution of Civil Engineers, London, an Associate of the Royal Institute of British Architects, and a member of the Council of the Nottingham Architectural Society, and has been in the employ of the Nottingham corporation for a period of eight years. There were 165 applicants for the vacancy at Leicester.

The foundation-stone of a school church at the Fall, Ardesley, near Wakefield, was laid by Lord Colville on Saturday. The building will seat 300 persons, will cost about £700, and is being built from plans by Mr. W. S. Barber, of Halifax.



## Building Intelligence.

**ALBANY, N.Y.**—The provisional building for the Protestant Cathedral of All Saints, at Albany, N.Y., was dedicated on the 20th ult. It is of brickwork, being the shell of the design proper up to the eaves, and is covered in with a temporary wooden roof. The structure will ultimately be faced with stone, and has been designed by Mr. Robert W. Gibson, of Albany, formerly of London. It will have a total length of 265ft., by an average width of 95ft., the width across transepts being 110ft., and across nave, between aisles, 40ft., and across choir, 35ft. The height to keystone of vault over nave roof is 70ft., and that of chancel 66ft. It will be English Early Decorated in style and details; but the height and treatment of the vaulting are French. There will be a broad central tower, covered with an octagon roof, rising to a height of 180ft., and two western towers and spires, each 203ft. high. The building material is light-red stone from Potsdam, with darker stone from Long Wendon for dressings and internal work. The contractor is John Smith; 2,503 seats will be provided. The cost of the provisional building is 250,000dols., and the complete structure nearly 600,000 dols.

**BIRMINGHAM.**—An important block of buildings, situated in the best part of Broad-street, one of the leading thoroughfares in this town, and having a frontage of about 100ft., is now rapidly approaching completion. This building consists of two double-fronted and four single-fronted shops, with large show-rooms and bedrooms over, and necessary outbuildings, &c. A free treatment of Gothic has been adopted in the elevation, which is of a somewhat ornamental character. Minton's tiles have been used for banding courses, and for filling in window-heads to first and second floors, and ornamental stone, brickwork and woodwork, stone and wood carving, and white glazed bricks have also been freely introduced. The proprietor is Mr. C. Ede, of Edgbaston, and the architect Mr. J. Statham Davis, of 53, Newhall-street, Birmingham.

**BURTON-ON-TRENT.**—The new institute at Winhill, which has been built by public subscription, was opened on Saturday, November 24th. The buildings have been erected in Mount-street, by Messrs. Lowe and Sons, from designs of Messrs. Osborn and Reading, architects, of Birmingham, at a cost of about £1,500, and consist of an entrance hall, a large lecture hall, ante-room and cloakrooms, reading-room, classrooms, caretaker's residence, &c. The materials used are red bricks and stone dressings. The rooms were filled with the principal inhabitants of Winhill and the district.

**GNOSALL.**—The parish church of Gnosall was reopened last week after restoration under the direction of Mr. Charles Lynam, of Stoke-on-Trent. The principal works effected embrace (1) the removal of the flat plaster ceilings from the nave and aisles, thus throwing open the timbers of their roofs. Those to the aisles are of oak; but the nave roof is of modern construction, and of deal. It has been strengthened by supplementary timbers, and new boarding has been fixed between the rafters. (2) The clearance from all the walls and internal dressings of stonework of the plaster and colour-wash which disguised the ancient masonry. (3) The rearrangement of the floors throughout; those to the passages being of new plain tiles, and the spaces under the benches of wood. (4) The passages are placed against the walls wherever practicable. (5) The conversion of the former pewing into open benches. (6) The provision of a new heating apparatus for the whole building on the low-pressure principle. New oak doors have also been provided. Repairs to the roofs, glass, and walls generally have also been effected. The old pulpit is to be re-used, but it has a new stone base, and a new alabaster font has been erected at the west end. The eastern part of the church was restored some years ago, under the direction of Mr. Ewan Christian, Mr. Muirhead, of Newport, Mon., was the contractor.

**HEREFORD.**—The Victoria Ward for children, just added to the General Infirmary, was opened on Thursday, the 29th ult. It is a red-brick

structure of two stories, with Codsall-stone dressings, and adjoins the main buildings. The length is about 72ft., and the width 27ft. The main room is 49ft. by 24ft., and 13ft. 6in. high, and the beds are arranged on both sides in the spaces between the windows. The walls are distempered in green and adorned with a dado of encaustic tiles 4ft. 6in. high. At one end of the ward is the nurses' room, a head nurse's room, an extra room for the nurses, an extra ward, a bath-room, and a small kitchen. Mr. F. R. Kempson, of Hereford and Llandaff, has been the architect for the work, as he was for the Hawkins' Ward, which was built three or four years ago, and for the new entrance porch to the main building, which was finished a short time since. Mr. Collins, of Tewkesbury, was the contractor, and the encaustic tiles were supplied by Messrs. Godwin and Son, of Lugwardine.

**SPARKHILL, BIRMINGHAM.**—The new church of St. John, Sparkhill, was consecrated by the Bishop of Worcester on Saturday. The part of the church already erected, and now ready for opening, will seat 663 persons, and when the whole is completed there will be accommodation for 1,000 worshippers. The church is cruciform in plan, with a nave at present 58ft., and when completed 102ft. long by 45ft. wide. The south transept is 45ft. by 16ft., the north 45ft. by 14ft., with an annexe 28ft. by 7ft. The chancel is 30ft. by 44ft., with an apsidal end—an organ-chamber on one side, and a vestry capable of accommodating 50 people on the other. The structure is of brick, with Derbyshire stone dressings, and the style adopted is Geometrical Gothic. The roof is covered with brown tiles, supported on iron ribs, which are inclosed in pitch-pine. The floor of the church is covered with deal blocks, and that of the chancel with tiles. The seats are of deal. The gas-fittings and altar-standards have been supplied by Hart, Son, Peard, and Co. The pulpit will be of oak, richly carved, on a Caen stone base. The reading-desk will also be of oak. The present cost of the church will be about £4,550, and the cost of the remainder, without the tower and spire, is estimated at £1,685, making a total of £6,235. The architects are Messrs. Martin and Chamberlain, and the builders Messrs. Sapeote and Sons.

**WARMINSTER.**—The work of restoring the parish church is making good progress, but it will not be finished by the end of the year. The architect is Mr. Arthur W. Blomfield, A.R.A. During the rebuilding of the chancel portion the clerk of the works was Mr. J. Simpson; but he was afterwards removed to Woodford, Essex, and Mr. W. Conradi has since fulfilled the duties. All the carved and sculpture work in stone and wood about the new nave and aisles, like that of the chancel, is by Mr. Harry Hems, of Exeter. The wrought metal work is by Messrs. Singer and Son, of Frome. A new pulpit has been given by Mr. George Vicary, of Warminster. It will be octagonal on plan, nearly 7ft. high, and will have a base of blue Pennant stone, upon which will be a cluster of eight polished Devonshire marble columns. These support the main body of the pulpit, the lower part of which is to be of polished variegated marble. The angle columns and the upper cornice will also be of the same material, whilst the rest will be in grained yellow magnesian limestone. There will be carved angels at each of the six angles. The pulpit, and also a new font, are being made in Mr. Harry Hems' studios at Exeter.

### ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

**LIVERPOOL ARCHITECTURAL SOCIETY.**—At a meeting of Professional Associates, held on Thursday evening, the 29th ult., the present condition of the society was discussed. In the end a number of suggestions for the general improvement of the society were adopted, and a copy forwarded to the President and Council, together with a request that a special meeting be called to take them into further consideration.

At a vestry meeting held at St. Mary's, Bridgenorth, it was decided to take steps to restore the church, including the replacement of the high-backed pews by modern seats.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings, communications respecting illustrations or literary should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members' staff by name. Delay is not unfrequently caused. All Drawings and other communications sent at contributors' risks, and the Editor will undertake to pay for, or be liable for, unsought corrections.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach office not later than 3 p.m. on Thursday. Front advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

### NOTICE.

Bound volumes should be ordered early (price 2 Shillings each), as only a limited number are done. A few bound volumes of Vols. XLII, XLVI, XLIX, L, LII, LIII, and LIV may still be had, price 1 Shilling; all the other bound volumes are out of stock. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring back numbers to complete volume just ended, order at once, as many of them soon run out of print. Cases for binding the half-yearly volumes, 2s. Reading cases 2s. each.

RECEIVED.—G. and Co.—B. U. R. S. A.—S. Bros.—Co.—M. and Co.

PHIPPS. (Laxton's is the best price-book. There is specially devoted to carpenters and joiners.)

### "BUILDING NEWS" DESIGNING CLUB.

**PICCIOLA.** (The pair of semi-detached houses given subject B may, of course, have windows in the walls; but it should be borne in mind that this class often are built in a series of pairs, and when placed close together, as they usually need to be, on account of the value of frontage, the windows of one house overlook the windows of the next. In the designs we have asked for, a clever "hit miss" arrangement of window openings, &c., for this reason, weigh much with us in making award.)—W. W. ("Teak" is more distinctive "Oak" for motto.)—W. A. SUGDEN. (The Rules Designing Club were printed in our issue for Nov. 1883.)—COUNTRY COUSIN. (We cannot be responsible for the accuracy of the rules and regulations. You really must comply with the rules and write name and address on the back of each drawing.)—KIRBY PARKINSON. (See answer to W. A. S. You had better not try to put more rooms into the villa than the accommodation stipulated. The given will be quite enough for the dimensions of site.)—F. T. WRIGHT. (The drawings are returned due course. Drawings are received up to the Saturday giving 28 days clear of the date of publication.)—MONTAGUE. (Thanks for suggestions. We are glad to see the Club still so popular.)—JOHN MANN. H. J. H. J. B. AND OTHERS. (Read the rules and follow printed instructions. Several contributors in this respect, and give needless trouble to us, as to themselves.)

**DRAWINGS RECEIVED.**—"Glyp," "Shadow," "warts," "Vir Super Hostes," "H" in a circle, "N" in a circle, "Ichabhu," "Picciola," "Fairy," "X. Y. Z," "Spider," "Tyro" in a circle, "Moth," "Artifex," "Jak-Point," "Advena," "ona," "Darkey," "Avalon," "Il Penseroso," "El Perseverance," "Legna," "St. Tudno," "York Fledgeling," "Oswald," "Policy," "Goth," "Hemus," "Rienzi," "Mancunium," "Yeoman," "Hawkeye," "Westford," "Primrose," "Nil De andum," "Savant," "Venator," "An Old Blue," in a circle.

## Correspondence.

### CLAUSES IN BUILDING CONTRACT.

To the Editor of the BUILDING NEWS.

SIR,—There are a few points in the report of Messrs. John Wood and Son, to which I ask your permission to be allowed to refer.



In the first place, the assumption that my letter was "evidently written in opposition to the plea for justice to builders in Mr. Waterhouse's excellent address as P.R.I.B.A.," is best answered by the fact that the architects of Exeter had arrived at their decision some months before Mr. Waterhouse's address was delivered.

The removal of what Messrs. Wood consider redundancy of words in my statement of the case (and to which I do not at all object) does not make the architects of Exeter less "nervous," nor does it make the proposal appear less alarming," inasmuch as nothing Messrs. Wood say disposes of the fact that in all cases of error there is but one just course—viz., a stating of all the items throughout the bills. Architects are prepared to face this—well and good.

I note Messrs. Wood's cynical reference to gentlemen who take out their own quantities in contradistinction to "properly trained surveyors," in whose work it is very rare to find errors; but I may state that the instances in which I had found discrepancies occurred in the bills of quantity surveyors of acknowledged position, one of whom was recommended to me as one of the largest builders in the West of England.

The suggestion that architects of position do not undertake this branch of work is so palpably outside the facts that it could be answered in the negative by a large number of members of the Institute, as well as others who do not belong to that body, but whose capacities, I suppose, would hardly be called into question.

But, Sir, what are the grounds for the alleged "gross injustice" in continuing the "compunctible practice" of limiting the period for discovery and rectification of errors?

When I first entered the profession about twenty-one years ago the practice of supplying quantities was scarcely in existence in the provinces, except in the case of large works. Builders rushed into the fray of competition, and wasted far too much time, it must be admitted, over purely speculative work. Gradually that condition of things has been proved, and now it is the custom to supply quantities very generally, with the condition that "although believed to be absolutely correct, they are not guaranteed, and that no action can be entertained after the signing of the contract." Such a condition is manifestly unjust, because it is offering a privilege which, in nine cases out of ten, it is morally impossible for the builder to take advantage of.

But supposing the time is extended to twenty-one days from the date of signing contract—which, in most instances, is not for a week after the tender is accepted—here any reasonable person who would say this time is not sufficient to allow a builder the opportunity of testing, either certain items, or all the items, should he feel so disposed?

The truth is, that under the quantity system the builder is very properly relieved of the competition of former days; such competition is, in fact, reduced to a minimum, and is much less than that of the architect, and it seems to me that the rights of the employer, who pays for quantities, in order that he may know fully at the outset what his building contract will be, and the privileges of the architect, are involved in this proposal to reduce the present custom of accepting a contract to one merely a schedule of prices.—I am, &c.,

JAMES CROCKER, F.R.I.B.A.

Exeter, Dec. 5.

**STONE-CARVER IN THE UNITED STATES.**

SIR,—The following letter is one I have just received from Nebraska State, U.S.A., and is dated 15th Nov. 1888. The lines are penned by an apprentice of mine, whom I last saw in New York last year, and who was then rather at the despotic action taken by the local unions. It, and the list of prices appended, may be read with interest by some of our readers.—I am, &c.,

Exeter, 1st Dec., 1888.

HARRY HEMS.

[COPY.]

SIR,—I utterly refused last spring to pay the fine dollars (£10) the New York Stone-Cutters' Society laid upon myself and all others who had passed the river in Europe, and so, as I could not get a job in that consequence, I started for a Boston (Mass.) firm,

and went for them to Allegheny (Pa.) I have been with them ever since, and have work that will last till the middle of January—i.e., of course, if the weather does not stop us. I was at Allegheny six weeks, and then was sent to St. Louis, in Indiana, some 700 miles further west. I was there four months, and then was ordered to Kansas City, and recently came on from there here.

I joined the trade society at St. Louis, paying 10 dollars (£2). The fact is, it is a very hard thing to obtain work in this country unless you are a society-man. Even the architects prefer bosses (employers) who employ union men. I certainly like the Western better than the Eastern States. The work is not nearly so hard, and one is paid better money. There is plenty of excellent stone, and no end of variety in coloured marbles in the Western part of this state (Nebraska), but hereabout (eastward) it is quite prairie land, and the stone used chiefly comes from a distance. Indeed, until quite lately the buildings have been chiefly of wood, and it is only during the last three years that brick and stone have been used generally.

It is quite astonishing how large a hold terracotta has upon the public taste all through the States. It is, as a rule, infinitely better than English terracotta; one never sees any "cripples" or broken lines in it here, like one so often notices in England.

The favourite style of carving in the States just now is Romanesque, introduced by the late Mr. Richardson, of Boston, an architect who has had as much to do with the general acceptance of that style as the late Sir Gilbert Scott, R.A., had to do with the revival of Gothic work in England. Personally, although all the rage here, I do not care for it, as it is nearly all surface work.

I have stood the summer better this year than last, and have only lost half a day from the heat. It was very hot at St. Louis: the thermometer was for weeks at 98° in the shade, and only dropped to 90° at midnight. What with the heat and the mosquitoes, sleep was next to impossible. The Fall (autumn) has been beautiful. We have only had two wet days for the past three months. I enclose our local price list for masonry, and remain, yours faithfully,

The following is the document referred to:—

**PRICE LIST ADOPTED BY THE JOURNEMEN STONECUTTERS' ASSOCIATION OF KANSAS CITY, MO.**

- FOR NATIVE LIMESTONE (100 cents = 4s. 2d.)
- Pitch-faced ashlar for fence work, 12in. or over in height, per superficial foot, 20 cents (10d.); 12in. or less, per lineal foot, 20 cents (10d.); the above cut to dimension, 25 cents (1s. 0d.).
  - Pitched-faced ashlar with draft, 12in. or over in height, per superficial foot, 30 cents (1s. 3d.); 12in. or less, per lineal foot, 30 cents (1s. 3d.).
  - Pitched-faced ashlar with 1½ toolled margin, 12in. or over in height, per superficial foot, 40 cents (1s. 8d.); 12in. or less, per lineal foot, 40 cents (1s. 8d.).
  - Ashlar, rough, pointed face, 12in. or over in height, per superficial foot, 35 cents (1s. 5d.); 12in. or less, per lineal foot, 35 cents (1s. 5d.).
  - Ashlar, pointed face with toolled margin, 12in. or over in height, per superficial foot, 45 cents (1s. 10d.); 12in. or less, per lineal foot, 45 cents (1s. 10d.).
  - Curbing, per lineal foot, 20 cents (10d.); water table with wash pitched face, per lineal foot, 40 cents (1s. 8d.).
  - Base, course pitched face with wash, per lineal foot, 35 cents (1s. 5d.).
  - Steps, bush hammered, per lineal foot, 65 cents (2s. 8d.).
  - Plain, pitched-face window-sills, per lineal foot, 30 cents (1s. 3d.).
  - Door sills, bush hammered face, 14 to 20in. in width, per lineal foot, 75 cents (3s. 1½d.).
  - Bush hammered wall coping, 14 to 20in. in width, per superficial foot, 65 cents (2s. 8½d.).
  - Bush hammered fence coping, 2ft. in height, per lineal foot, 1.35dols.
- PIER BLOCKS:**
- Pier block, pitched face, per cubic foot, 20 cents (10d.).
  - Pier block, pointed face, per cubic foot, 30 cents (1s. 3d.).
  - Pier block, bush hammered, rough, per cubic foot, 50 cents (2s. 1½d.).
  - Pier block, fine bush hammered, per cubic foot, 60 cents (2s. 6d.).
  - Pier blocks less than 12in. in height to be measured as 12in.
  - Washes, per lineal foot, 10 cents (5d.).
- BRIDGE WORK.**
- Ashlar, per superficial foot, 35 cents (1s. 5d.).
  - Headers, per superficial foot, 45 cents (1s. 10d.).
  - Corners, per superficial foot, 40 cents (1s. 8d.).
  - Coping, bush hammered top with pitched face, per cubic foot, 40 cents (1s. 8d.).

**A CORRECTION.**

SIR,—While thanking you for the notice of Mr. Wilson's etchings you so kindly gave in last week's paper, I beg to call your attention to the misprint in my name. I am called Mr. Cleaver. If it is not asking too much, I should like the error corrected.—I am, &c.,

H. E. PEARCE.

Cleaver-street, Kennington-cross, S.E.

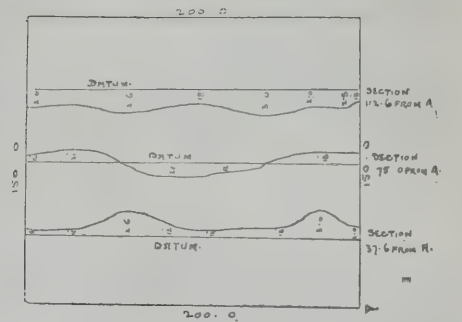
The foundation-stone of a chapel for the Calvinistic Methodists of Tremereichon, Flintshire, has just been laid. The chapel, which will accommodate 140 persons, will be in the Early English style, built of limestone and pressed Ruabon brick, with Lilanasa stone dressings. The interior fittings will be in pitch-pine. The whole will cost £300, and the contract has been given to Mr. John Jones, builder, St. Asaph.

Under the will of the late Mr. William Dunnett the Corporation of London have received a valuable bequest for their Art Gallery, in the shape of a large collection of paintings, sculpture, marbles, and bas-reliefs.

# Intercommunication.

## QUESTIONS.

- [9851.]—**Bankruptcy of Contractor.**—I am obliged to the two gentlemen who have replied to my query. But it was particularly the course to be pursued with regard to the bankrupt contractor on which I wished for information, not as to the future carrying out of the work undone.—SPES.
- [9852.]—**Pressure.**—Will some reader kindly give me the principle whereby I may calculate the pressures per foot on the following or similar cases? The pressure on the sides and ends of a cast-iron service reservoir or tank 50ft. long, 30ft. wide, and 15ft. deep. The pressure on canal lock gates, the depth of water being 8ft.;—as some books say that the pressure is only on account of the depth and not the area of the surface of water, whilst others say the contrary. Also the pressure which a water main of 4in. diameter has to withstand, and how the thickness of metal is ascertained when the height of the reservoir is 80ft. above the point in question, and the lengths of pipes are 400 yards of 8in. main, 300 yards of 7in., 400 yards of 6in., and 200 yards of 4in.; total, 1,300 yards. And also what would be the difference in the pressure if the height was increased to 200ft.—M.
- [9853.]—**Tennis Court.**—Will some reader of the BUILDING NEWS kindly advise me in the following? I want to make a tennis court to be flooded in the winter for skating purposes. What is the best material to use, and the substance of such materials used that will answer both purposes?—An early answer will oblige.—PETTIT.
- [9854.]—**Probationary Drawings at Institute Exam.**—Will someone who has passed the Institute exam. kindly furnish me with a few particulars as to the probationary drawings required? Must the design necessarily be in one of the pure styles, such as Gothic or Classic, of an elaborate character, and should the drawing be finished up in black and white or in colour?—EXAM.
- [9855.]—**Excavations.**—Would you please explain the best method of computing, 1st, the number of cube



- yards of excavations, 2nd, the number of cube yards of filling?—NO NAME.
- [9856.]—**Proportions of a Concert or Lecture Hall.**—I should be glad if some reader will give any particulars of a well proportioned hall for hearing, and name an example; also the mode of warming adopted. Any information as to actual buildings will be esteemed by—ENQUIRER.
- [9857.]—**Warming by Water or Air.**—Which is the most economical system, and give the best results? The room is a large one, used for public meetings. There is a basement.—A BUILDER.
- [9858.]—**Building and Adjoining Owner.**—Can a building owner enter a house of adjoining owner for the purpose of carrying out any work he may have authority to do? If so, is not a written notice necessary? I shall be obliged for reply as to what is the usual procedure in such a case.—ADJOINING OWNER.
- [9859.]—**Levels.**—What is the best modern levelling instrument, and what is the best way to obtain it? I am told the instruments used in the Ordnance Survey are of the best, and can be bought very cheaply at the depôts; Will someone advise me upon the subject?—IDONEUM.

**REPLIES.**

[9837.]—**What is a Billion?**—I beg to offer the following reply:—

Units .....	0
Tens .....	00
Hundreds .....	000
Thousands .....	0 000
Tens of thousands .....	00 000
Hundreds of thousands .....	000 000
Millions .....	0 000 000
Tens of millions .....	00 000 000
Hundreds of millions .....	000 000 000
Thousands of millions .....	0 000 000 000
Tens of thousands of millions .....	00 000 000 000
Hundreds of thousands of millions .....	000 000 000 000
Billions .....	0 000 000 000 000

Thus showing that one billion is also one thousand of thousands of millions, not as "H. H." says in your last issue, "one hundred thousand millions," for then there would only be twelve figures. See above diagram.—TRIED IT BEFORE.

[9819.]—**Cement, &c.; Measure Boxes.**—I beg to say that I have had several large floors (self-supporting) laid in Liverpool warehouses, and using the "three" measure boxes. Certainly the different foremen never complained of their men being hampered with three measures, and with all respect to "G. A. S.," I prefer to have three separate measures used, as my sketch shows (see BUILDING NEWS, Nov. 23, 1888), as I think it is more easily watched than when you use one large mea-



sure for coarse stuff (or broken metal) and fine stuff (or sand), for how are you to be certain that the proper quantity of sand is used unless you stand over each gauging so as to be there just the moment the first part is completed? But by using my method you can easily watch the gauging as you are passing to and fro, as I have proved by experience.—TRIED IT BEFORE.

[9838].—**Building Act—Steam Pipes—Low Pressure.**—I beg to offer the following in answer to "R. W.'s" question—What is "low" pressure? Also, what is "under" pressure? In "The Steam Engine," by Dr. Lardner, page 96, it is as follows:—"By 'low' pressure engines is to be understood those in which the safety valve on the boiler is loaded at the rate of 4 to 6 lb per square inch," and on p. 108 of the same book—

Total pressure in lbs per sq. in.	Corresponding temperature.	Cubic inches of steam produced by a cubic inch of water.	Mo'chne's effect of cubic inch of water evaporated in lbs. raised 1 ft.
4	152.3	5685	1895
6	169.2	5597	1948
15	212.8	1669	2086
50	283.2	554	2308
100	332.0	295	2462

And in Molesworth's "Pocket-Book of Formula," p. 451, as follows:—

Atm'sphere included.		Temperature of steam.	Specific volume.	No. of atm'sph's.
lbs. per sq. in.	Ins. of mercury.			
4	8.142	153.1	5583	272
6	12.213	170.2	3813	408
14.706	29.922	213.0	1642	1000
15	30.533	213.1	1610	1020
50	101.776	281.0	518	3060
100	203.551	327.9	270	6800

And in "Practical Treatise on Heat," by Thos. Bax, page 10 and 11, as follows:—

Pressure above atmosphere in lbs. per sq. in.	Temp. Fahr.	Cubic feet of steam from one cubic foot of water.	Elastic force in inches of mercury.
0	212°	1640	29.92
55	281	591	102.0
37	283	503	105.3
84	327.9	273	204.0
91	332.0	256	216.4

I think that the above three tables conclusively show why the pipes are not to be placed nearer than 6 in. to any combustible materials. For notice that the heat in the steam increases with the pressure; thus in steam below pressure, or say under 15 lb. to the square inch, is under 212°; when you reach 50 lb. to the square inch the heat is 450°, or more than the melting point of tin (442°). It is generally understood that if high-pressure steam heating pipes are not carefully fixed, it is quite possible to get them sufficiently hot to destroy timber, if not to set fire to it. I have seen timber that has had its nature destroyed simply by being placed too close to 100 lb. pressure steam-pipes in a mill.—TRIED IT BEFORE.

[9839].—**Staircasing and Handrailing.**—"One Willing to Learn" should study "Newland's Carpenter's and Joiner's Assistant," "Tarbuck's Encyclopedia of Carpentry and Joinery," "The New Guide to Carpentry and Joinery," by Robert Scott Burn; "The Carpenter, Joiner, and Handrailer," by Robert Riddell; "The Orthogonal System of Handrailing," by Joshua Jaays. "Wilson's Carpentry and Joinery" is a very cheap book, and contains ten plates on the subject. For prices of the above write to Batsford, Bookseller, High Holborn, London, W.C. You should have a good knowledge of elementary solid geometry before you commence to study any of the above. There is not a book published on the subject of handrailing that contains a correct face mould for the square-cut system.—TRUE SQUARE CUT.

[9844].—**Stamp Duties.**—In reply to "Doubtful's" queries (1 to 6), No.—QUANTITY SURVEYOR.

[9844].—**Stamp Duties.**—I consider that no stamps would be required in either of the matters referred to by "Doubtful."—H. L.

[9847].—**Wooden or Iron Churches.**—Iron is certainly the best material to use for a temporary building. A license would be granted for three years by the Metropolitan Board if the application be approved.—H. L.

[9847].—**Wooden or Iron Churches.**—Wood is preferable for a temporary church. Why not use concrete slabs for the walling? A license in writing must be obtained from the Metropolitan Board of Works. The period is determinable by them; but this can be renewed by application for an extension of the period, provided a surveyor's certificate as to its condition is satisfactory. The M.B.W. usually grant a license for three years if they approve application.—G. H. G.

[9848].—**Liability of Landowner.**—I know of a similar case. The agent can charge for what he did—viz., letting the land. He cannot recover for both letting and selling, because one is alternative to, and not separate from, the other.—H. L.

[9848].—**Liability of Landowner.**—The whole question is a matter of agreement. If the builder to whom you have let the land has not carried out the terms, he cannot compel you to execute a conveyance. The agent's claim appears to be a usual one.—G. H. G.

[9848].—**Liability of Landowner.**—"R. W." is liable for the amount claimed.—SURVEYOR.

[9849].—**Valuations.**—Tarbuck's "House Property" is a useful handbook on the subject of valuations; also Ryde's Handbook.—G.

## Our Office Table.

At King's College, on Wednesday, a meeting was held for the purpose of opening a fund for repairing the church of St. Mary-le-Strand, reinstating it in its former condition, putting it in a state of safety to the public, and removing the present unsightly and obstructive hoarding, and for reopening the church. The sum proposed to be raised for this purpose is £3,000. The Bishop of London, who occupied the chair, hoped that they would do their utmost to preserve this beautiful church, which formed so conspicuous a feature in the Strand. Mr. J. MacVicar Anderson, architect, read a report on the church, stating that the whole of the foundations were thoroughly sound, and that the sum of £3,000 would cover all that was necessary to be done. Mr. Ewan Christian moved. Mr. F. G. Hilton Price seconded, and the Bishop of Marlborough supported, a resolution in favour of the restoration. Mr. Cole, as a parishioner, thought that this church was hardly wanted in its present position, and stated that an architect engaged to make a report to the parishioners on the repairs necessary had stated the expense would be £8,000. Other speakers followed, some opposing and some supporting the resolution, which was ultimately carried. A resolution was then passed pledging the meeting to assist the committee of the fund.

DR. G. DANFORD THOMAS concluded on Wednesday the inquiry into the deaths of the six men who were killed by the collapse of premises in course of construction in Great Titchfield-street, Marylebone, on the 9th of November. It will be remembered that at the last sitting the architect, Mr. Miller, said the collapse was a mystery to him. After further evidence by Mr. Pluckrose, partner in the firm of Oldrey and Co., the contractors, and Mr. H. H. Collins, district surveyor, and others, the jury gave a verdict of "accidental death," adding: "The jurors, after hearing the evidence of the experts, are of opinion that the 14 in. wall, built in mortar, was not sufficiently strong to carry the weight of the superstructure, which, on a continuous iron bressummer, was concentrated upon the column in the centre of the building in Ridinghouse-street, and the jurors consider that this was the cause of the sudden collapse of the building. The jurors consider that such iron columns should have been placed on brick piers, built in cement; and further, that the practice of loading floors of new buildings with materials used for their construction, or otherwise, should be avoided, as likely to cause strains upon the building generally. The jurors are further of opinion that the architect, Mr. Miller, should, in the exercise of his discretion, have taken greater care in designing such building, so as to insure the stability without risk of any kind. Further, that they consider that enlarged and discretionary powers should be conferred on district surveyors, so as to permit more efficient supervision than they at present possess."

THE four years' arbitration between Messrs. Kirk and Randall and the East and West India Dock Company has, it is announced, terminated in an award, by Sir Frederick Bramwell, in favour of the contractors on all points. The Arbitrator decides that the turning out was illegal, and that there was due to the contractors, for work done at the time of their eviction, a balance of upwards of £195,000, apart altogether from damages for the wrongful eviction, which have yet to be assessed, and for which the contractors' claims are £300,000. The Dock Company has to pay all costs.

THE Surveying Committee of Bath considered on Monday a report presented by a special committee with regard to the position of the surveyor and assistant-surveyor, Mr. G. J. Parfitt and Mr. C. R. Fortune. The clerk had called attention to the judgment given recently by Mr. Justice Stirling in the action "Lewis v. the Weston-super-Mare Local Authority," in which the authority had an injunction granted against them on the ground that Mr. Powell, who signed the report, was not "the surveyor." The clerk to the Bath Authority thought that the position of Mr. Parfitt and Mr. Fortune was not compatible with the decision given. The special committee recom-

mended that Mr. Fortune be appointed the surveyor to the authority, that the statutory duties now performed by Mr. Parfitt should be done by him, and that Mr. Parfitt should be appointed consulting engineer. No alteration in the remuneration now given was recommended. The report was adopted.

THE excavations on the Acropolis at Athens have again, a *Standard* correspondent states, brought to light valuable works of ancient art. The principal are parts of a number of statues of heroic size, which, when put together, make up two groups. One of these represents Hercules killing the marine deity, Triton. The other group consists of three mythical monsters of which the upper portion represents the body of a man, while the lower part is a serpent. These discoveries are some of the most interesting ever made on the Acropolis. They resemble, to a large extent, the figures found not long ago among the ruins of the ancient Temple of Assos, near Troy. The workmanship, as well as vivid colouring, have excited the admiration of local archaeologists, who attribute the sculptures to the 7th century B.C.

## STATUES, MEMORIALS, &c.

MR. BOEHM'S NEW STATUES.—The statue of the late Emperor Frederick of Germany, which Mr. Boehm, R.A., is executing by command of the Queen, represents his late majesty in cuirassier uniform, over which are worn the robes of the Garter. The Emperor's hands are resting upon his sword. The statue will be placed in St. George's Chapel, Windsor, near that of the late King of the Belgians, which is also Mr. Boehm's work. Mr. Boehm also has now at his studio the colossal bronze equestrian statue of the late Prince Consort—the jubilee offering of the women of England to the Queen. This is to be placed on a granite pedestal at Smith's-lawn, Windsor Park.

## PARLIAMENTARY NOTES.

BUILDINGS IN STREETS.—In the Lords, on Tuesday, the Public Health Acts Amendment (Buildings in Streets) Bill passed through Committee. Its object is to give power to municipal authorities to prevent houses being brought forward in such a way as to interfere with the existing lines of frontage of streets.

## MEETINGS FOR THE ENSUING WEEK

MONDAY.—Society of Engineers. Annual meeting, 6 Victoria Chambers, S.W. 7.30 p.m.  
Society of Arts. "Light and Colour," Cantor Lecture No. 3, by Capt. W. de W. Abney, C.B. 8 p.m.  
Surveyors' Institution. 8 p.m.  
Leeds and Yorkshire Architectural Association. "Beauty in Colour and Form," by J. Aldham Heaton.  
TUESDAY.—Society of Architects. "The Arts and Crafts from an Architect's Point of View," by W. Woodward, A.R.I.B.A. 7 p.m.  
Institution of Civil Engineers. Discussion on "The Influence of Chemical Composition on the Strength of Bessemer Steel Tires." 8 p.m.  
WEDNESDAY.—Society of Engineers. Annual dinner Guild Hall Tavern. 6 for 6.30 p.m.  
Society of Arts. "Explosives," by W. H. Deering, F.C.S. 8 p.m.  
THURSDAY.—St. Paul's Ecclesiastical Society. "Hern Church, Kent," by the Rev. J. R. Buchanan, Vicar of Herne. St. Paul's Chapter House, E.C. 7.30 p.m.  
Edinburgh Architectural Association. "Recent Departures in Electrical Engineering," by A. C. Elliot, C.E. 8 p.m.  
FRIDAY.—Architectural Association. "Symbolism," by W. Doubleday, of Birmingham. 7.30 p.m.  
Institution of Civil Engineers. "The Spanish Torpedo Boat, *Arleto*," by J. K. Salter. 7.30 p.m.

Architectural Association, 9, Conduit street, W.—December 14, 7.30 p.m. By-laws of Affiliated Societies. Paper on "Symbolism," by W. Doubleday, Esq.

Mr. John Bagnold Burgess, the well-known painter of Spanish domestic figure subjects, frequently in conjunction with church porches and other architectural accessories, is the new Royal Academician, having been elected on Wednesday night to fill the place of the late Frank Holl.

The parish church of Uckfield is being restored from plans by Mr. Harry Scarlett. The chancel is being extended eastwards, the galleries removed and the building will be re-floored, seats being substituted for pews. Mr. Canty, of Tunbridge Wells, is the contractor, and Mr. Ransom the clerk of works.



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

VOL. LV.—No. 1771.

FRIDAY, DECEMBER 14, 1888.

### OMISSIONS IN CONTRACTS.

**I**NCOMPLETELY-DRAWN plans and specifications are among the penalties which an exacting age inflicts upon architects. In a lately-decided case of appeal, in which a quantity surveyor had been employed to take out quantities, and they turned out to be defective, it was ruled that the surveyor did not guarantee his work, so that the contractor was the sufferer. The blame in both instances must be thrown on the eagerness there is to obtain low tenders for the work. If the surveyor is inaccurate, or omits large items, the fault must be laid to either his own carelessness or that of the architect. A little closer acquaintance with the inner workings of the architect's duties will readily convince us that there are exceptional temptations to inaccuracy. The client gives instructions that cannot be reasonably complied with; he wants a great deal more than can be included in the contract for the sum he proposes to spend on the building, and the architect is often disposed to take these incompatible orders. A high-handed client, of the precise, matter-of-fact character, says, "I want a building of certain accommodation, but the cost must not exceed so and so." The architect accedes, preparing designs that he knows cannot be carried out for the amount, but that might, by a little cooking and compromise, be built for the money. It will not do to parley or explain with a client of this sort. Answers must be "yes" or "no." No half-measures or compromises will satisfy. If the building cost more this kind of client has a ready remedy. He declines to pay the architect's bill, on the ground that his orders were disobeyed. Many in practice can point to several cases in which this disagreeable alternative has suggested itself to the mind of the close-fisted client. The *dénouement* is as sudden as it is unexpected. We remember an instance where a client refused to pay the architect on the ground that an extra charge had been passed by him for the grates to a house, which the client had imagined ought to have been included in the contract sum or tender. In vain did Mr. Architect expostulate on the unreasonable nature of the demand made upon him. The amount claimed for commission was nearly £100. The grates had cost the client about £60; thereupon he refused to pay the architect. There had been, at an early preliminary conference, something said about leaving the grates out of the contract, and the architect had too hastily concluded that such was an order, and he readily embraced any omission that would reduce the tender. The architect brought an action to recover his commission, which ended in a compromise. Omissions in specifications are the inevitable result of demanding more than the sum to be expended will allow. One case of the kind may be noticed. The architects were instructed to prepare the necessary plans and specifications for a house, the cost not to exceed a certain sum. Tenders were invited; but they were all higher than the client wished to spend, and he therefore undertook to make certain reductions in the work, and accepted a tender which did not include the painting and paperhanging. The contractors finished their contract. The client grew angry at the omission, and called upon the architects to compel the contractors to carry out the terms of the specification, in which there was a general clause to the effect that anything required to complete the building

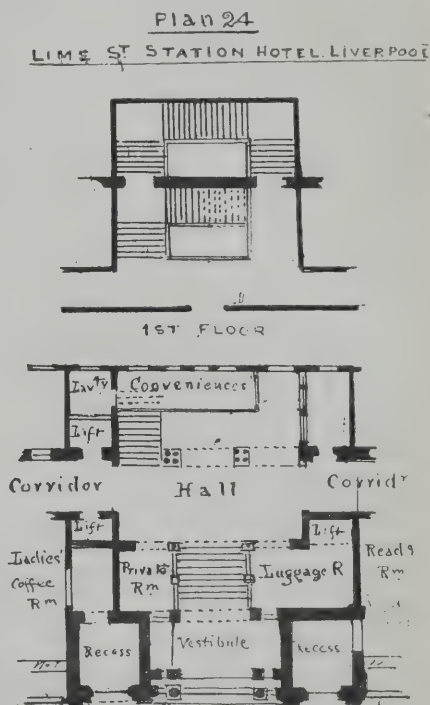
to the satisfaction of the owner should be done, even though not described. They refused to consider this clause as binding in the case mentioned. Though legal advice was sought, better counsels prevailed, and the owner completed the omitted work at his own expense, but held the architects liable. We do not know whether the deduction from their charges was made or not. Legally, there would be no ground for such a proceeding. The ordinary individual has a strange idea about omissions. He regards them as extras, for which the architect is solely responsible. Of course, the secret of this notion is the conviction that there ought to be nothing left out, that all tenders should be inclusive. He does not look at the unreasonable demand made by him upon the architect to supply what he requires at a cost that is quite insufficient. He obtains low tenders; but if by chance some item like a cupboard is left out, he reproachfully comes to the architect and asks him to call upon the builder to have it fitted up. Tendering in these days is very much a matter of cutting down, taking advantage of small slips in the specifications, trimming this or that item of materials or labour. The responsible builder who will not stoop to these cheeseparing practices in his estimating puts against each item a full price. But the trimming or low-tendering practice is one in which the architect—as we have shown—is inclined to participate, and to make compromises with exacting clients. The surveyor employed to take out the quantities knows that by making them too full he may lose a commission—the recent decision has at least taught him that his responsibility shifts to the contractor. In the long run the employer sustains the loss. He is likely to have the brickwork or joiner's work scamped. Little or nothing is lost by an omission so long as the cost afterwards incurred does not exceed the expense at first, had it been originally included in the contract. This extra cost is the only one which a court of law could charge to the negligence of the architect. Yet clients look upon the omission as an extra; they do not see it other than in the light of one. In a properly drawn up contract the owner pays for nothing that is not introduced, and under a fair schedule a contractor can only charge for the omitted work at the same rate as if he had at first included it in the tender. The only question is, whether the owner suffers any damage by the omission. Let us suppose the specification included pugging and sound boarding to the floor, but that this item was omitted from the quantities. The cost of afterwards making good the omission would be greater, as it would necessitate the taking up the flooring; the owner would be put to increased cost if he undertook the work, and he might fairly claim damage for delay. So he might if it had been decided to board and felt the roof, and the contractor had omitted to include the work in his tender. On the contrary, other items, such as painting or graining, sash fastenings of a superior quality, could be subsequently undertaken without incurring an expense beyond that originally contemplated.

Building competitions are now so often a matter of sharp practice—among builders who compete to win—that we must expect to find the instruments prepared by architects and surveyors have lost in precision and accuracy. Experience has shown that builders accept contracts and sign specifications containing the most equivocal clauses. It is customary to find specifications provide for trenches to be excavated to depths that may be necessary to insure a solid foundation—a clause open to the wildest guessing. In other cases a clause is inserted to the effect that the contractor is to provide materials and execute works that may not be specified, but which are necessary to complete

the building. More remarkable still, we find builders agreeing to sign these documents and willing to undertake the responsibilities and risks of contracts of this kind. They argue that if they refused to undertake the risks others would do so, the result being that incompetent men would have it all their own way.

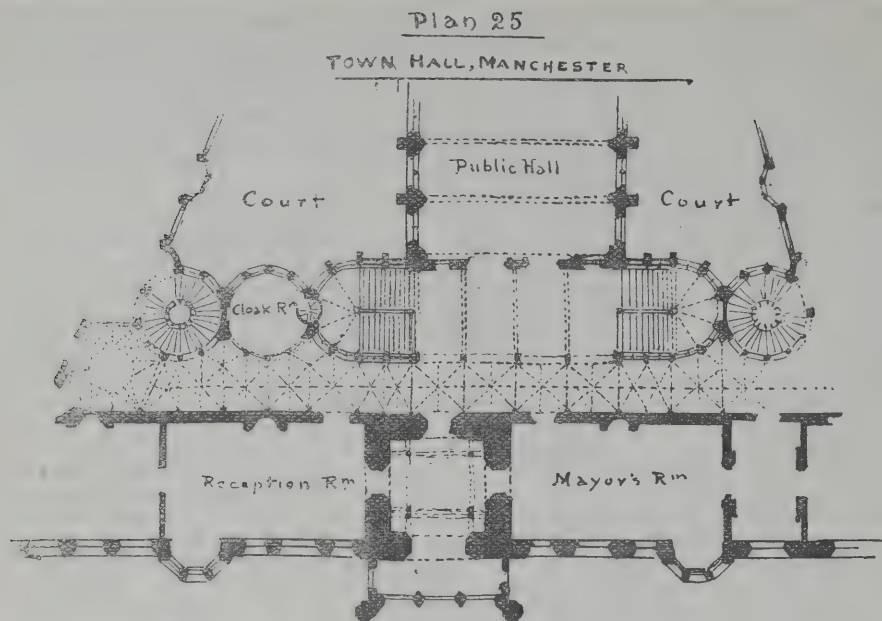
### HALLS AND STAIRCASES.—XI.

**O**NE way of producing a dignified arrangement in a building in which a central hall has to be reached on the ground floor is to divide the stairs into two parts, or to place a flight on each side of the centre corridor. This plan was adopted in one or two of the designs sent in for the Imperial Institute, which we have briefly referred to. A double staircase is the result of this division. The flights can be made to face one another on each side of a hall, each lighted by areas, or they can be placed on the outer sides of a central or domical hall in the manner shown by Messrs. Deane and Sons in their plan for the Imperial Institute. In a large public edifice, with the principal floor above the



ground level, this double arrangement affords some distinct advantages: it enables both staircases to be used when the first floor is crowded, or one for ascent and the other for descent, or both can be used at the close of any public meeting. A further advantage is that an unbroken vista is obtained through the centre hall. Mr. Alfred Waterhouse, R.A., whose planning is generally well thought out, felicitous, and artistic, has adopted the double stairs to his Town Hall at Manchester, a plan of which appears on next page. The effect of the vaulted vestibule and apsidal-ended staircases is imposing, and the eye is carried through to the public hall, which occupies the centre of the triangular area. In his description of the Town Hall, the architect says: "The grand staircases each fill a vaulted space 26ft. by 20ft., and 43ft. in height, with a polygonal end where the two quarter spaces occur. The division wall is arcaded with double shafts, and carries the pierced and arcaded balustrade of the upper flight, which is continued round the staircase wall on the first floor between the vaulting shafts, which spring from the steps themselves. The spandrels of the groined roof are filled in with colour, and in the tall traceried windows, which light these stair-





cases from Princess-street and Lloyd-street courtyards, colour is also introduced, but very sparingly, as I find the sky of Manchester does not favour the employment of deeply-stained glass. Two traceried stone screens divide these staircases from the ante-hall, up to which they conduct the visitor." Our plan represents the first-floor level, the main corridor, the ante-hall between the double stairs of four bays, with timber roof, through which access is gained to the public hall. Of the circular staircases, two of which are shown on the plan and the third at the other end of the building, Mr. Waterhouse says the one at the Princess-street entrance is of coffee-coloured Shap granite, both shafts and steps, that at Lloyd-street entrance is of a dark, Irish grey granite, and that at Cooper-street end of light grey Dalbeattie. Each step has a moulded soffit, the risers are polished. The cylindrical newels are pierced with spiral arcing, following the steps; the shafts are double, of polished granite. These stairs are divided from the corridors by arcades, with wrought iron filling-in to the openings, and are lighted through windows from the courtyards. Over them are lanterns for ventilation. The pierced traceried newels, and the stone screens between the stairs and the corridors, permitting the visitor to obtain varied and passing glimpses of the traffic in the latter, are interesting features of these circular staircases, which connect the main corridors on the three sides of the building, each 750ft. in length. We have few instances in England of open pierced newels. Mr. Thomas Purves Marwick, A.R.I.B.A., in his valuable essay on staircases, illustrates one beautiful example in the Château Châteaudun, in which the newel is solid and shafted with panels, the latter enriched by arabesques. The openings pierced in the outer walls give a picturesque variety to the different stages of the stairway. This mode of treatment was a favourite one among the architects of the Renaissance in France, a notable example of which is found in the staircase of Francis I. in the Château de Blois. The richly-carved newel, with its shafts springing out of moulded spiral strings or handrails, is charmingly *riante* in design.

The Lime-street Station Hotel, Liverpool, also by Mr. Waterhouse (see plan 24), is another example of a convenient arrangement of a single central staircase with recessed stairs, and corridors running right and left from the main entrance. The flights are well set back, and two groups of pillars give an architectural framework to the hall. We might multiply instances of central hall and stairs; but the student of planning will not find any difficulty in adding to the examples we have

given. Our object has been to indicate a few of the more prominent types of staircase halls in which architectural disposition has been the chief aim. Two or three distinct types of hall plan have been instanced. 1. Staircase halls which are contained within the main walls and are lighted by a lantern or side areas. 2. Staircase halls that are recessed and are lighted from a courtyard at the back. 3. The open-galleried hall lighted above and surrounded by corridors.

Amongst the more moderate-sized halls of which we have given a few instances, we cannot omit to include the clever and highly artistic treatment of stairs in the late Mr. Pepys Cockerell's gallery for the Royal Society of Painters in Water-Colours, 5A, Pall Mall. The small square area devoted to the vestibule or hall has been utilised to the best advantage. On the right, after entering, four curved steps lead up to a quarter landing; thence the flight is continued along the side wall, and returns a few steps, with risers of double curvature on plan, to the landing of mezzanine, which is carried across the hall, and forms a ticket-collector's recess behind. The front of the landing has a open stone balustrading broken by a circular bayed recess, which projects as a pleasing feature in the hall below. Two stone columns with Corinthian capitals supporting ceiling beams or architraves divide this landing from the remaining portion of the hall, and one of these columns is placed in the upper corner of the flight at the turning, forming a kind of newel, though quite distinct and isolated. The stone balustrading of the stairs is pierced to a pleasing design with balusters at intervals, and forms a circular turn at the corner round the column. The ceiling is divided into compartments by moulded and enriched beams. The manner in which the columns are made to divide into compartments the space, and to articulate the plan of the stairs, is clever; the genius and taste of the architect are further shown in the unique details of the stairs, and the solid stone newel of the bottom flight.

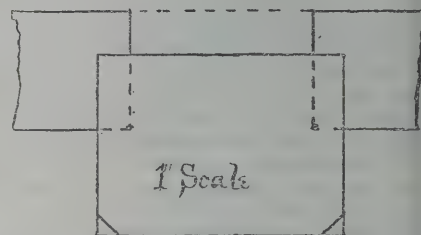
#### CARPENTRY AND JOINERY.—VIII.\* FLOORING.

WHILST on the subject of girders and warehouse floors, there is a method of constructing a floor similar to a framed floor, and yet much simpler. It is by means of girders placed, say, 10ft. from centre to centre, and joisted at right angles to their length, then the flooring required would be such as is used for ordinary joisting, unless circumstances would render heavier flooring necessary.

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Figs. 52 and 53 show the method of construction. The joists are let into notches cut for them in the beams. It is not necessary to take anything out of the under edge of the joists, as that would reduce their capability of bearing weight. Fig. 52 shows a filling-in piece between the end of the two joists, in order to continue the floor. In the case of hollow walls, a wall-plate is required on each side of the cavity, and the joists reach over the space and rest upon the wall-plate of the part of the

Fig 52



wall which is towards the outside. Should the cavity be within a brick breadth of the outside that cannot be done, and the two parts of the wall are held together either by iron ties or bonding bricks. Where the upper stories of a building are of half-timbered work, it may be necessary to carry the joists into the bottom or sill-piece in the manner shown in Fig. 52.

There is a method of imitating parquet flooring by contrasting two different woods in forming the floor, having them equal in width and

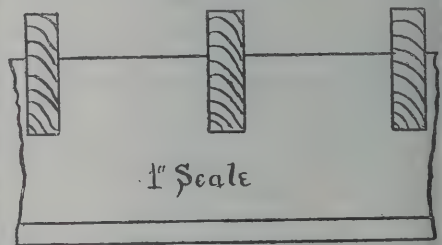


Fig 53

one about, say, walnut (American) and oak, or mahogany and pitch pine, or any combination of a similar kind—there must, however, be a contrast. It need hardly be stated that no trace of nails should be seen; it, therefore, would be prepared and nailed down as described of Figs. 47 and 48. Where hearths occur in the floors of rooms it is usual to mitre a border of oak or other hard wood round about them, when the other flooring of the room is of a softer wood. It is usually from

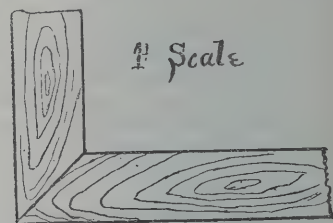


Fig 54

2½ in. to 3 in. or more in width. The mitre at the angles is shown in Fig. 54.

This border may be the full thickness of the flooring, and would rest upon the joists. Provision must be made so that the ends of the flooring boards, as also the oak border, shall both have solid nailing; therefore, the border should not be as wide as the trimmer-joist is thick, and it is sometimes necessary to put in pieces between joists and at right angles to them in order to carry the oak border. But having hinted at what is necessary, provision can be made when the emergency arises. How-



ever, some avoid these difficulties by another method, which cannot be thoroughly approved of—that is, by putting in the border  $\frac{1}{2}$  in. thick only, rebating out of the flooring around the hearth the space necessary. If this is neatly done, and the veneer well glued, as also the bed for it, and when put into its place fastened in with a few fine brads (hooks) punched in, and the holes stopped with putty coloured to match the wood, it serves fairly well. Parquet flooring, which is joiner's work, has to be prepared for with very great care, and this is done by means of what is known as counter-flooring, and which forms the bed or surface upon which is laid the parquet. There is a great difference in counter floors. The best adapted has to

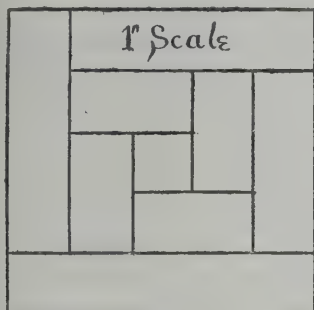
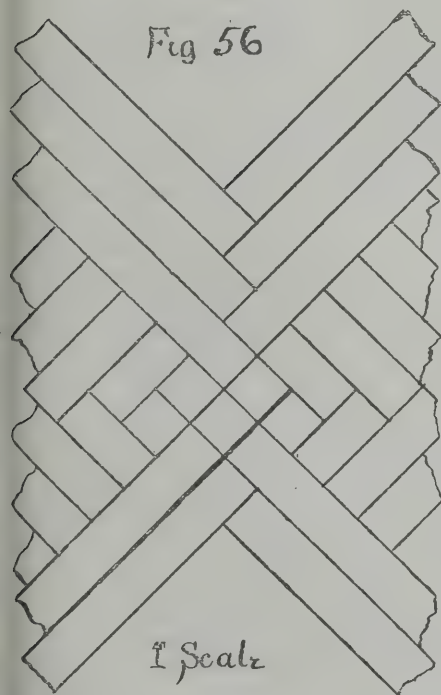


Fig 55

have, first of all, thoroughly seasoned joists, upon which is nailed down flooring  $1\frac{1}{4}$  in. thick, which also must be thoroughly seasoned and put closely together, and then traversed off, so that it will fill a straightedge in all directions, and, in addition, be perfectly level. It will be comparatively easy to lay parquet flooring upon this, as the timber, being thoroughly seasoned, will readily take the glue, and the

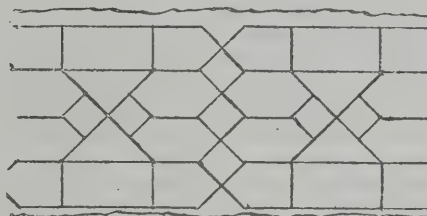


surface being true in all directions, it will not in any way alter the joints of the flooring to be laid upon it, and, in addition, is thick enough to allow the brads used in putting down the parqueting to take a firm hold. As each piece of parqueting is put down the surface of the counter-floor is glued, also the under side of the parquet, and its edges where it is joined to another piece. The under side of parqueting and upper side of counter-flooring may be roughened with a toothed plane, which will enable it the better to hold the glue. It is hardly necessary to state that no nails are to be seen at all. Parqueting is all prepared in the workshop to whatever design is intended,

and marked so as that each piece shall be readily put where it was prepared for.

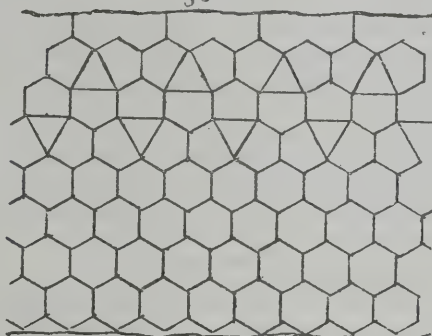
Figs. 55 and 56 show two simple designs which could be adopted as part of a floor, either as a border, or could be extended to form the whole; the floor could be of oak, the grain contrasting itself on account of the pieces meeting at angles; or various coloured woods could be used, bringing out more boldly the design. In preparing parqueting in the workshop, the design is laid down on a board, and then the wood of whatever kind or kinds is worked to suit; being jointed, square-edged, and after being marked, all the pieces are grooved on the edges which come together, with a circular saw (steam), the groove made to be sufficiently large to allow of a fairly strong tongue or fillet being put in, which, of course, is glued also in the laying of it down. When all the parqueting is laid it is carefully cleaned off, scraped, and sand-papered, in readiness for the polisher. It is known to the readers of this paper that many firms make a speciality of this kind of

Fig 57

 $\frac{1}{2}$ " Scale

work; but, in addition, many building firms do their own. Where the counter flooring is not so well done as above stated, it is either, say,  $\frac{1}{2}$  in. flooring laid in the ordinary way, or else it is laid diagonally across the joists; this, of course, strengthens the floor, and is somewhat of an advantage in nailing down the parquet flooring, because the joints are much less likely

Fig. 58

 $\frac{1}{2}$ " Scale

to run parallel with the joints of the parquetry; and occasionally the parqueting can be nailed through into the joists, and even any tendency to warp on the part of the counter flooring is diminished. The great objection to light counter flooring is its liability to yield under the pressure of the foot where there is much traffic, or furniture being removed. If it is used let it be well seasoned, tongued and grooved, well traversed when laid, and good freshly-made glue used in laying the parquetry.

Two simple designs of parqueting are shown in Figs. 57 and 58. These may be made of one kind of wood only, when, as no two pieces of wood are exactly alike, and owing to the effect of light and shade and the geometric forms, very fine effects are brought out. But different kinds of wood may be used, contrasting with each other in colour, &c., which will, of course, produce other effects.

As an afterthought, it may be as well to state that the size and outline of the room to be parqueted must be had, and laid down correctly,

in order to prepare it in the workshop, so that it may suit exactly when placed in position. Sometimes, however, borders only of parquetry are put down, the remaining portion of the floor being of a less expensive character.

#### THE ROYAL ACADEMY SCHOOLS.

THE prizes gained by the students, both male and female, at the Royal Academy Schools, were distributed on Monday night by Sir Frederic Leighton, P.R.A., in the presence of a large company, which included many of the Royal Academicians and Associates.

Landscape painting.—Creswick Prize (£30), John Henry Frederick Bacon. Painting of a figure from the life.—Silver medal, 1st, Marcus Worsley Blackden; silver medal, 2nd, William T. Maud. Painting of a head from the life.—Silver medal, 1st, Stephen Briggs Carlill; silver medal, 2nd, Percy Short; *proxime accessit* Ernest Appleby. Copy of an oil painting.—Silver medal, 1st, Thomas Eyre Macklin; silver medal, 2nd, not awarded. Copy of a landscape.—Silver medal, not awarded. Cartoon of a draped figure.—Silver medal and prize (£25), Arthur George Walker. Design in monochrome for a figure picture.—Armitage Prizes, 1st (£30) and bronze medal, Leonard Leslie Brooke; Armitage Prizes, 2nd (£10), William T. Maud. Design for the decoration of a portion of a public building.—Prize (£40), William Farran Littler. Drawing of a figure from the life.—Silver medal, 1st, Stephen Briggs Carlill; silver medal, 2nd, Harry Windsor Fry. Set of six drawings of a figure from the life.—1st prize (£50), not awarded; 2nd prize (£25), Stephen Briggs Carlill\*; 3rd prize (£15), Sigismund C. H. Goetze; 4th prize (£10), John Henry Frederick Bacon. Drawing of a head from the life.—Silver medal, 1st, Alice Maria Dicker; silver medal, 2nd, Ernest Spence. Drawing of a statue or group.—Silver medals, 1st and 2nd, no competition. Drawing of a statue or group.—Prize (£10), Ella Brown. Perspective drawing in outline (open to painters and sculptors only).—Silver medal, no competition. Model of a design.—1st prize (£30), Herbert Charles Nye; 2nd prize (£10), Arthur George Walker.† Set of three models of a figure from the life.—1st prize, (£50), Henry Charles Fehr; 2nd prize (£20), John Wenlock Rollins. Model of a figure from the life.—Silver medal, 1st, Henry Charles Fehr; silver medal, 2nd, Charles John Allen. Restoration of a mutilated antique statue.—Silver medal, not awarded. Model of a statue or group.—Silver medal, 1st, Paul Raphael Montford; silver medal, 2nd,† Model of a statue or group.—Prize (£10), Anna Maria Gayton. Design in architecture.—Arthur Rutherford Jemmett has been awarded the Travelling Studentship for Architecture (value £60) for his clever design for a monumental fountain, which is drawn in a thoroughly French manner with projected shadows both for plan as well as elevation. The style of the composition may be described as Neo-Grec, quite Parisian in idea, and Mr. Fasnacht, the teacher of the architectural class at the Royal Architectural Museum, Westminster, is to be congratulated on the success of his fortunate pupil at Burlington House. Exception might be fairly taken to the way in which some of the shadows are cast, as, for instance, that thrown by the water in the upper part, and the effect of the right-hand angle of the frieze oversailing the pier below is somewhat unhappy if not actually incorrect. One other set of drawings was submitted for this prize, and it ranks only as a poor second. The first silver medal was given to Charles Spencer Haywood for a set of measured drawings of the unfinished wing built by Charles II. for his new palace at Greenwich, from the designs of Webb, the kinsman of Inigo Jones, in 1664. The second medal was not awarded in this subject, although there were two or three other competitors. None of the drawings were equal to the merit displayed in former years. Set of architectural designs (upper school).—Prize (£25), George William Nicolay. Set of drawings of an architectural design (lower school).—Prize (£10), Francis Donkin Bedford. The

\* Disqualified owing to having received the same prize before.

† Disqualified owing to having received the same prize before.

‡ Only one student entered for this competition.



silver medal for perspective, open only to architectural students, was awarded to Amos Francis Faulkner, for his drawing in crisp outline of the celebrated semi-circular porch to the north transept of St. Paul's Cathedral, and although the only competitor, he has certainly won the medal by the care and thoroughness of his work.

The Landseer Scholarships in painting and sculpture, of £40 a year each, tenable for two years, given for the best work done in the examination for passing into the second term of studentship, have been awarded—in painting, to Percy Short and Harold William Butcher; in sculpture, to Thomas Richard Essex and William Henry Prosser.

## PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XXIII.

By HENRY LOVEGROVE, F.S.I., Surveyor.

### TILER—DIMENSIONS CONTINUED.

	ft. in.	ft. in.	
2	1 3	2 6	Cutting and waste to do.
	51 6		Add.
	2 6		Deduct ornamental vertical tiling
	4 0	10 0	and battening plugged to wall for
			window to stairs of dwelling.
	13 0		Cutting and waste to do.
2	5 6	11 0	Portland cement pointing and fillet
2	9	1 6	to tiling next door.
	13 0		Add window.
	8 9	8 9	Add.
	1 3	1 3	
	38 6		Ornamental vertical tiling and battening
	8 9	336 11	plugged to wall side wall.
1	8 0		
	5 0	20 0	Deduct do. roof over bay.
	3 6		
	8 9	30 8	Deduct do. for chimney.
	4 0		
	3 9	15 0	Deduct do. for window.
	6 9		
	4 9	30 5	
4	8 9	35 0	Cutting and waste to do.
	15 6		
	23 0		Add windows.
2	6 6	13 0	Raking, cutting, and waste to do.
	26 3		Plain tiling and battening plugged
	1 3	32 10	to wall.
2	1 3	2 6	Cutting and waste plain tiling.
	1 6		
	7		Raking, cutting, and waste to do.
	8		C. and W. on do.
	26 3		Add.
	35 6		Do to ornamental tiling and fitting
30	1 0	30 0	to rafters.
	74 0		Ornamental vertical tiling and battening
	8 9	647 6	as before back wall.
	4 6		
	3 6	15 9	Deduct do. for windows.
	69 6	69 6	Cutting and waste and fitting to feet
59	1 0	59 0	of rafters as before.
	11 6	11 6	Cutting and waste for windows.
	74 0		
	1 3	92 6	Plain tiling and battening as before.
	74 0		
2	1 3	2 6	Cutting and waste to do.
	2 9		Deduct ornamental tiling, &c., as
3	5 3	7 0	before at angle.
	5 0		Raking, cutting, and waste to do.
	43 0		Ornamental vertical tiling, &c., as
	4 0	172 0	last at back of coach-house.
	40 0		Cutting and waste and fitting to feet
24	1 0	34 0	of rafters.
	4 6		Raking, cutting, and waste to do.
	2 0		Deduct ornamental tiling, &c., as
1	3 3	3 3	before.
	43 0		
	1 3	53 9	Plain tiling and battening as last.
2	1 3	2 6	Cutting and waste to do.
	43 0		
	9 9		Angle tile and fixing.
	5 3		Add.
	51 6		Double co. plain tiles in ct. to bottom
			of vertical tiling.
	26 3		Add.
	74 0		Add.
	43 0		Add.
	10 0		Double course plain tiles in cement
			and deal tilting fillet to gables bay.
	19 0		Double co. plain tiles in cement and
			deal tilting fillet large gable.
	6 6		Add back dormer.
	7 0		Add loft.

### DRAINAGE OF STABLES.

Descriptive notes have been supplied by the architect as a preliminary to the dimensions. The details herewith illustrated, together with the drainage plan, clearly show how the

several parts are arranged, and a few words by way of description are therefore only necessary. It will be noted that part of the rainwater on the orchard side of the building is separated from the stable drainage, and after passing a filter-pit is collected in a tank a few feet away, and so pumped for laundry purposes. This filter is drawn out in detail, by which it will be noted how the catchpit, with its inverted arched bed, like the rest of the filter chamber, provides a means of collecting leaves and other matter for easy removal by way of the iron door over it. The stone cover, too, is easily taken off the other half of the chamber when the filtering material requires renewal. Open galvanised wirework walls retain the breeze, and the inlet is sufficiently high as to permit the water passing in storm time above any deposit in the catchpit, while the filter itself is so arranged to a sufficient height as not to allow the water passing over except during excessively heavy rains, when, of course, but few impurities would be contained by the water. The rainwater tank has an overflow pipe discharging into a neighbouring ditch, and is ventilated. The situation of this block of building renders it necessary to drain into a cesspool. The drains are all brought together into the centre of the yard, where an inspection and trap pit is placed to receive them at Q.

From this point each branch is readily inspected and got at, an air-tight iron door made by Dyer giving access to the chamber, with a Hellyer's invert floor and inspection capped trap siphon attached as shown by the enlarged section to the right of the plan. Three of the branch drains, as marked by the letter V, are used as ventilators, and by that passing under the coal-place the w.c. trap is relieved of all pressure of soil-gas. A mica flap fresh-air inlet, placed in the angle next the wall-pier, provides a current to promote the upcast draught through the pipes from the chamber Q. A smaller inspection pit covered by a stone is placed at the angle near the house where the bend of the drain from the sink occurs, and another is situated at the end of the rain-water drains, also shown by the general plan. In order to simplify the removal of soil from the cesspool, a pail-pit, P, is contrived to intercept the passage of paper and litter or solids, thus permitting only liquids to pass into the sewage tank, from whence it is pumped into a cart and readily removed and used. The pail, made of galvanised iron, with perforated sides and bottom, is easily lifted by the span-handle and emptied. An iron door, as before described, effectively incloses the pit. In this case the cesspool is placed about 15ft. away from the pail-trap; but the distance in any other case would vary, according to circumstances, and the drain, of course, between it and the pail-pit would be got at from the outlet end. The pipes are all glazed ware, with mastic joints. The surface drain in the stable is of the usual description.

### DRAINAGE.

	ft. in.	ft. in.	
	88 0		3in. salt-glazed socket jointed drain-
			pipes, with Stanford's patent
			joints and digging, average 2ft.
	16 0		deep.
			4in. do. do. to tank.
			4. Ends 3in. pipe made good to brick
			chamber.
			1. Do. 4in. do.
			1. Extra to 3in. junction.
			3. Do. 3in. bend.
			1. Stoneware culvert for one pipe and
			fixing.
INSPECTION PIT.			
4	4 0		
	4 0		
	4 0	256 0	D'g and cart.
4	4 0		
	4 0		
	1 0	64 0	Concrete.
4	9 0		
	3	9 0	2 B. footings.
4	9 0		
	3	9 0	1 1/2 B. footings.
4	9 0		
	2 6	90 0	1 B. wall.
4	3 0		
	3 0	36 0	4in. tooled York cover.
4	12 0	48 0	Fair tooled edge.
4	1	4	Strong wrought-iron ring and letting
			in with lead.
4	6 0		
	2 0	48 0	Render in Portland cement on brick.
2	1 6		
	1 6	4 6	

RAIN-WATER FILTER.			
ft. in.	ft. in.		
6 6			
4 9			
5 0	154 5		Dig and cart.
6 6			
4 9			
10	25 9		Concrete.
2 6			
2 0			
1 0	5 0		Add.
15 0			
3	3 9	1 1/2	B. footings in cement.
16 0			
3 6	52 6	1 B	in cement.
3 6			
2 10	9 11		6in. tooled York slab.
3 6			9 by 8 tooled York curb.
7 2			9 by 6, and including joints.
3 6			Labour to sunk rebate in York 5in.
3 6			girt.
8 0			Add 4in. girt.
4 0			
2 0	8 0		Hellyer's invert floor to chamber.
1			Dyer's patent air-tight door 2ft. by
			1ft. 9in., and fixing in stone curb.
2	2 6		
	2 10	14 2	
	2 0		
	2 0	5 8	
2	1 6		Render in Portland cement on brick
	3 6	10 6	
	2 0		
	3 6	7 0	
	1		
			Pail of stout wrought-iron galvanised
			wire 2ft. by 2ft. and 1ft. 8in. high,
			with strong angles framing as
			filter.
28 0			3in. drain-pipe as last, and digging
			average 2ft. deep.
42 0			4in. do. and digging 2ft.
20 0			3in. do. and do. do.
56 0			Add.
26 0			4in. do., and dig. 2ft. deep.
22 0			6in. do., and dig 3ft. 3in. deep.
36 0			6in. do., and dig. 2ft. deep.
1			Grease trap and fixing.
1			Glazed stoneware culvert for 3in.
			pipes.
11			Making pipes good to brick chamber.
2	1	2 0	Rendering.
5	1	5 0	Extra to 3in. bends.

### PAIL PIT.

	ft. in.	ft. in.	
4 0			
4 0			
7 0	112 0		Dig and cart.
4 0			
4 0			
9	12 0		Concrete.
1 6			
1 6			
9	1 8		
9 0			
3	2 3	1 1/2	B. footings.
9 0			
5 9	51 9	1 B.	wall.
9 0			6 by 4 tooled York coping, including
			joints.
			1. Dyer's air-tight door, 18in. by 18in.,
			and fixing in stone curb.
			2. Ends pipe made good to drain.
6 0			
5 0	30 0		Render in Portland cement on brick.
			1. Pail as last, but 1ft. 4in., 1ft. 4in.,
			and 1ft. 6in. high, with wrought
			iron handle, 3ft. long.

### INSPECTION CHAMBER.

	ft. in.	ft. in.	
5 6			
4 6			
4 0	99 0		Dig and cart.
4 6			
2 3			
9	7 7		
6 6			
4 6			
1 0	24 9		Concrete.
4 6			
2 3			
9	7 7		
13 0			
3	3 3	1 1/2	B. footings.
13 0			
2 6	32 6	1 B.	wall.
3 6			
1 9	6 2		5in. tooled cover stone.
10 6			Fair tooled edge.
7 6			9 by 4 tooled York curb, inclu. joints.
8 0			Labour to sunk rebate, 5in. girt.
10 0			
2 6	25 0		Render in Portland cement on brick.
			1. Dyer's patent air-tight door 2ft. by
			2ft. and fixing in stone curb.
			1. Kenon's patent floor with centre
			channel and five branches and fix-
			ing in bottom of chamber.
			1. 6in. siphon trap with cleaning arm
			and cap
			4in. C.I.R.W.P. as air pipe.
6 0			1. Main valve fresh-air inlet and fix-
			ing on last.
			8. Ends R.W.P. made good to drain.



## ABSTRACT—DRAINAGE.

3in. salt-glazed socket-jointed drain-pipe, with Stanford's patent joints & digging, average 2ft. deep.	End pipes made good to drain.	Ends pipes m.g. to brick chamber.	3in.
85 0	2	4 Do. 4in. do.	
28 0	8	1 Do. do.	
76 0	5	11 Rendering.	
190 0	Extra to 3in. bends		
4in. do. and digging, average 2ft. deep.	Extra to 3in. junctions.	Stoneware culvert for one pipe and fixing.	
16 0	1		
42 0	6in. siphon trap with cleaning arm and cap.	Do. for 3in. pipes	
26 0	1		
84 0			
6in. do. & digging, 2ft. deep.	5in. do.	Supl.—4in. tooled York cover	
36 0	6 2	36 0	
Do. and do. 3ft. 3in. deep.	Reduced stock brickwork in mortar.	6ft. 6in. do. shafts	
22 0	1 B 1 1/2 B	9 11	
Do. and do. 4ft. do.	18 0 9 0	Run.—Fair tooled edge on 4in.	
16 0	90 0 170 11	48ft. do. on 5in.	
Inspection Chambers, Pail Pit, &c.	4 8 179 11	10 6	
Cube. Dig and Cart.	52 6 reduced.	Strong wrot. iron ring, and letting in and running with lead.	
256 0	51 9		
164 5	4 1		
112 0	256 4	Pail of stout wrot. iron galvanised wire 2ft. long by 2ft., and 1ft. 8in. high, with strong angle framing as filter.	
106 7	85 5		
629 0	170 11		
23 8			

Dyer's patent air-tight door 2ft. by 1ft. 9in. & fixing in stone curb.	Sunk rebate 4in. girt.	Basket of stout wrought-iron galvanised wire 4 by 1, 4ft. by 1ft. 6in. high, with stout iron handle 3ft. long.
1	8 0	
Do. 1ft. 6in. by 1ft. 6in. & fixing in stone curb.	Do 5 do.	
1	7 0	
Do. 2ft. by 2ft.	Do 8 in. do.	
1	8 0	

Extra only in cement.	6in. by 4in. tooled coping, including joints.	Render with Portland cement on brick.
1 B.—1 1/2 B.	9 0	52 6
4 8	9in. by 4in. do.	37 4
51 6	7 6	30 0
57 2	9 by 6 tooled curb, including joints.	25 0
19 1	7 2 9 by 8 do.	144 10
38 1 reduced.	3 6	16yds.

Cube. Concrete.	Supl. Hellyer's invert floors to chamber.	4in. C.I.R.W.P.
64 0	8 0	6 0
25 9	Kenon's patent floor to centre channel and five branches and fixing in bottoms of chambers.	
5 0		
13 8		
32 4		
140 9 5 6		

Yds. ft. in.	DRAINAGE.
0 190 0	Run. 9in. salt-glazed socket-jointed drain-pipe, with Stanford's patent joints and digging, averaging 2ft. deep, and filling-in
0 84 0	Run. 4in. do. and do.
0 36 0	Run. 6in. do. and do.
22 0	Run. 6in. do. and do. averaging 3ft. 3in. deep
0 16 0	Run. 6in. do. and do. 4ft. do.
	No. 8. Extra to bends in 3in. pipe
	No. 1. Extra to junction in do.
	No. 1. 6in. siphon trap, with cleaning arm and caps and fixing
	No. 10. Ends sollpipe, &c., made good to drain
	No. 4. Ends 3in. drain-pipe made good to brick chamber
	No. 1. Ends 4in. do.
	No. 11. Ends 4in. do.
	No. 2. Rendering round ends of pipe
	No. 1. Grease-trapp-c. 15s., and fixing
	No. 1. Stoneware culvert for one pipe and fixing
	No. 1. Do. for three pipes
24 0 0	INSPECTION CHAMBER, PAIL-PIT, &c.
6 0 0	Cube. Dig and cart
0 180 0	Supl. Reduced stock brickwork in mortar as described, including rough cutting
0 38 0	Supl. Do. extra only in cement
0 8 0	Hellyer's invert floor to chamber
	No. 1. Kenon's patent floor, with centre channel and five branches, and fixing in bottom of chamber
	No. 1. Dyer's patent air-tight door 1ft. 6in. by 1ft. 6in., and fixing in stone curb
	No. 1. Do. 2ft. by 1ft. 9in. and do.
	No. 1. Do. 2ft. by 2ft. and do.
	No. 1. Pail of stout wrought iron galvanised wire 1ft. 4in. by 1ft. 4in. by 1ft. 6in. high, with stout iron handle 3ft. long
	No. 1. Do. do. 2ft. by 2ft. by 1ft. 9in. do.

## HARD YORK-HIRE STONE.

Yds. ft. in.	Supl.	4in tooled cover
0 36 0		5in. do.
0 6 0		6 in. do.
0 10 0		Labour, fair tooled edge on 4in.
0 48 0	Run.	Labour, do on 5in.
0 11 0		Labour rebate, 3in. girt
0 8 0		Labour do, 4in. do.
0 8 0		Labour do, 5in. do.
0 7 0		6in. by 4in. tooled coping, including joints
0 9 0		9in. by 4in. do.
0 8 0	Run.	9in. by 6in. tooled curb and do.
0 7 0		9in. by 8in. do.
0 4 0		No. 4. Strong wrought-iron rings and letting in Yorkshire stone, and run with lead
16 0 0	Supl.	Rendering with Portland cement on brick
0 6 0	Run.	4in. cast-iron rain-water pipe, and fixing as in shaft
		1. Mica valve and fixing, as fresh air inlet to last

Carried to summary ...

## NEW LAW AS TO BUILDING LINES.

AN Act of great importance to builders, owners of property, and local boards has passed the House of Lords, and when it receives the Royal assent will become law. It is an amendment of the Public Health Act, 1875, entitled the Buildings in Streets Amendment Act, and deals with the much-debated question between urban authorities and property owners as to the building line to be observed in the erection of property. Up to a recent period it was generally thought by the law advisers to the different urban authorities that the 156th Section of the Public Health Act, 1875, applied to new as well as to old buildings; but in the case of "Williams v. the Wallasey Local Board," heard in the Court of Queen's Bench, March 20th, 1886, it was decided by Justices Mathew and A. L. Smith, that the section as it was then framed did not apply to new buildings in course of erection on land never previously built on. In consequence of this decision builders could build their houses just as they pleased without any regard to the building lines, and the urban authorities could not prevent them. The 156th Section, which permitted this, was repealed by the Act just passed, and in lieu thereof it has been enacted:—"That it shall not be lawful in any urban district, without the written consent of the urban authority, to erect or bring forward any house or building in any street, or any part of such house or building, beyond the front main wall of the house or building on either side thereof in the same street, nor to build any addition to any house or building beyond the front main wall of the house or building on either side of the same." This important amendment was drafted, with the assistance of Mr. G. Layton, clerk West Derby Local Board, by Mr. G. H. Ball, chairman of the Parliamentary Committee of the Wallasey Local Board, and at his instigation was introduced in the House of Commons by Colonel Cotton, M.P. for the Wirral Division, who has been assisted by Mr. Brunner, M.P. for Northwich, and by these gentlemen it has been successfully piloted through Parliament.

## BUILDERS' BENEVOLENT INSTITUTION.

## ELECTION OF PENSIONERS.

AN election of one pensioner on the funds of this institution was held at Willis's Rooms, St. James's, on the 6th inst., Mr. T. G. Smith (vice-president) in the chair—in the unavoidable absence of the president, Mr. J. Howard Colls.

There were three candidates for the one vacancy—viz., two men and one woman. The poll was open from 2 to 4 p.m. Shortly after the close of the poll, the scrutineers, Messrs. C. Bassell and Thomas Stirling, announced the result of the polling to be as follows:—viz., James Picing, 19, Mantau-street, Clapham Junction, aged 62, builder (fifth application), 2,079 votes; Ann Winter, 47, Maygrove-road, Brondesbury, aged 63, widow of Benjamin Winter, builder (third application), 2,185 votes; and Henry Whimble, 12, Devonport-road, Shepherd's Bush, aged 71, builder and decorator (first application), 1,817 votes (including 30 votes in respect of former subscriptions). The successful candidate was, therefore, declared to be Ann Winter.

## ARCHITECTURAL &amp; ARCHÆOLOGICAL SOCIETIES.

LEEDS AND YORKSHIRE SOCIETY OF ARCHITECTS.—Mr. John Aldam Heaton, of London, delivered a lecture to the members of this Society on Tuesday night, on "Beauty in Colour and Form." The President (Mr. H. Perkin) occupied the chair. The lecturer said that though now a Londoner, he was a native of Leeds, and appreciated the compliment paid him of being asked to discuss the subject before the society. With regard to beauty in colour, he remarked that Nature must be our textbook, though we must not suppose that the colouring of nature and of art could ever be identical. False colour and false form were mere exaggerations, distortions, excesses of good colour and good form. What we wanted, therefore, above all things was temperance. Nature was always temperate. In the case of the very gayest flowering plant ever seen, a careful examination would reveal the fact that what to the careless observer seemed a blaze of a certain tint was in reality a mass of subtle gradations. A student of colour soon found out that beauty of colour began with gradation—that the loveliness of graduated colour was so great that, relatively, level colour was not beautiful. But he also found that there was no such thing as level colour in Nature; natural colour was always in a state of gradation. Nature teemed with gradations; even when she played high she did so with a splendid moderation. He had made careful studies of many beautiful coloured things—flowers, iridescence on pigeons' necks and shells, peacocks' feathers, fresh mackerel, and many other such things—and he never came upon a piece of brilliant colour where he was not bewildered and puzzled by the complex ways in which harmonious and even opposing colours interlaced and died into each other. Having learned a practical lesson from Nature we should fearlessly stick to it, giving away or burning everything at home—picture, wool-work, mat, wife's dress, drawing-room curtains—everything that did not obey the new-found rules, and in time we should come to appreciate the value of quiet, moderate, tertiary tints. Let them take care that each colour in each article they bought was soft and graduated and free from crudity, and then they might set them all together and be happy. As gradation was the condition of beauty in colour, so curvature was the ground of all loveliness in form; but temperance, again, was the ruling power. A vote of thanks was accorded to the lecturer on the motion of Mr. W. H. Thorp, seconded by Mr. Cribb.

## ARCHÆOLOGICAL.

EDINBURGH CASTLE.—At the meeting on Monday night of the Royal Scottish Society of Antiquarians, Mr. Joseph Bain read a paper on "St. Margaret's Chapel in the Castle of Edinburgh," concerning fresh facts he had recently discovered in the Record Office, London. In the accounts of the Sheriff of Edinburgh it is stated that in 1335 a kitchen was made under the Great Chapel and timber provided for its roof. In the indenture by which the same Sheriff delivered over the Castle to his successor it is said that there is no dwelling within the Castle save a chapel a little unroofed, a little penthouse above the chapel, and a new stable quite unroofed. The Castle, in fact, seems to have been a ruin when the English regained it; but the new warden at once set to work to rebuild it in November, 1335. In June, 1336, there are entries in the accounts for glass windows in the Chapel of St. Margaret, and for the making of a water-spout of lead on the Great Chapel. This carries back the name of St. Margaret's Chapel a good many years further than the notices that have been quoted in a recent paper by Sir Daniel Wilson.

It has been discovered that the drains under the Mansion House are in so bad a condition that immediate reconstruction is necessary, and the Lord Mayor has been advised to remain within the building as little as possible. The reconstruction is in the hands of Messrs. John Mowlem and Co.

A new water-supply by gravitation has been supplied for the city of Ripon, at a cost of £25,000. The ex-Mayor performed the ceremony of turning on the supply on Monday.



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## ILLUSTRATIONS.

TWO VIEWS IN THE ALHAMBRA.—CASTLE OF ST. HONORAT, PROVENCE.—PUSEY MEMORIAL HOUSE, OXFORD.—SCHOOL HOUSE, ST. EDWARD'S, OXFORD.—HEAD-QUARTERS, 2ND MIDDLESEX ARTILLERY VOLUNTEERS, LEONARD-STREET, SHOREDITCH.—ST. MARK'S CHURCH, NOEL PARK.—COACHMAN'S HOUSE AND STABLES.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## TWO VIEWS IN THE ALHAMBRA, SPAIN.

THESE photographs from the Alhambra reproduced to-day are the work of an amateur of much ability, and they were shown at the recent Photographic Exhibition in Pall Mall. The *Patio de los Leones*, or Lions' Court, is represented by the upper picture. It furnishes one of the most familiar examples of Moorish architecture, and is well known to many through the reproduction at the Crystal Palace by the late Owen Jones, whose great folio volume on the Alhambra need only here be mentioned. The Lions' Court measures 100ft. by 60ft., and is entirely paved with white marble. The fountain in the centre, supported by lions, is in alabaster. The colonnade surrounding the court forming the cloister, of verandah-like character, is variedly spaced, the columns sometimes being disposed in groups of two or three, and sometimes in single order. These shafts are 9ft. high, and 8in. in diameter. The walls up to a height of 15ft. from the ground are lined with blue and yellow tiling. The peristyles and ceilings are richly elaborated with arabesques and endless cuspings of exquisite workmanship. The caps are decorated with inscriptions, and round the upper face of the fountain of the lions are carved some Arabic verses, describing in a style of Oriental hyperbole the glories of the fountain and the wonders of the place. The Alhambra, the ancient castle and palace of the Mohammedan kings of Granada, was built by Mohammed II. about the year 675 of the Hegira, or 1273 of the Christian Era. He gave it the name of Medmet Alhambra, or the Red City. The walls are built of a kind of cement of red clay and large pebbles, and the concrete thus formed is of great hardness. On each side of the Lions' Court is a projecting pavilion, through one of which our view is taken looking on to the corresponding pavilion on the far side of the quadrangle. These are roofed with domes rising over broad tile-covered eaves, supported on numerous rafter-pieces. Thin coats of whitewash cover the colour decorations of this court, and, of course, such an application of distemper has greatly damaged the beauty of the building; but here and there the original colours are clearly made out. The stucco work in the Alhambra usually is coloured with the primaries, blue, red, and yellow, secondary and tertiary colours occurring only in the mosaic dados or in decorations near the eye, and in such places greens, purple, and orange are the favourite tints made use of. The moulded surfaces of the architectural details are, for the greater part, painted red, blue being reserved for the deep hollows and parts in shadow, while yellow—or rather gold—is freely employed on all surfaces ex-

posed to high lights. Thus, as in the con-  
structional forms wherein all lines grow one  
out of the other, so in the coloured decorations  
the perfection of gradation is strictly observed  
in gradual sequence. The summit of perfection  
of Moorish art indeed is to be found in the  
Alhambra. Every ornament is based on the  
constructive idea, and the architecture is  
developed as it should be from the actual con-  
struction. The religion of the Moors precluded  
symbolism, but Arabic inscriptions enliven the  
decorations, and give historical records often  
of no mean importance. "The Hall of the  
Ambassadors," "The Court of the Fishponds,"  
"The Hall of the Abencerrages" (where the  
cicerone never fails to show the blood of these  
brave warriors, which, however, is nothing else  
but the deposit of the water, impregnated with  
iron, on the white stone), and "The Hall of  
the Two Sisters" (so called from two huge  
flags of marble, without flaw or stain, which  
are in the pavement) are among the more im-  
portant apartments of the building. The "Sala  
de Comares" was undoubtedly the richest in  
the Alhambra, and still exhibits traces of its  
past splendour.

## THE ARCHITECTURE OF PROVENCE AND THE RIVIERA.

WE draw attention to a work just published  
by Mr. David Macgibbon, of Edinburgh, the  
author of "The Castellated and Domestic  
Architecture of Scotland," who, having been  
called on a few years ago to make frequent  
journeys between this country and the Riviera,  
was enabled to study the architectural monu-  
ments of the South of France, and he has now  
brought his notes together in the volume  
before us,\* accompanying them with nearly  
three hundred sketches and plans in illustra-  
tion of his subject. After a general review by  
way of an introductory chapter of much inter-  
est, giving a comparative idea of the architec-  
ture of the South of France, which, of course,  
is very unlike the more familiar buildings with  
which the excursionist is acquainted in Nor-  
mandy and the northern provinces of France,  
the writer gives an outline sketch of the  
scenery and history of Provence, commencing  
with the colonisation of the Phœnicians  
through the Greek and Roman periods, and so  
on down to the Middle Ages, supplying by the  
way a valuable chapter on the political inci-  
dents which formed so important a factor in  
the development of the country from the extra-  
ordinary condition of fluctuation and uncer-  
tainty which existed after the overthrow of  
Roman rule to the early revival of civilisation  
in the twelfth century. The Roman Forum at  
Vienne, the Temple of Augustus and Livia, a  
complete specimen of a temple of the Romans  
in Gaul, and the Pyramid, or "needle," just  
outside the town of Vienne, are among the most  
imposing remnants of the days of its glory.  
The Roman Theatre and the Triumphal Arch  
at Orange, ascribed to Tiberius, the neighbour-  
ing arch at Carpentras, and the mausoleum  
standing near the ruins of a triumphal arch at  
St. Remy, are other examples of the first im-  
portance here fully illustrated, with views  
from the amphitheatres at Arles, Nîmes, and  
Fréjus, not forgetting a capital sketch of the  
great Pont du Gard, a magnificent speci-  
men of Roman engineering near Nîmes. The  
Transitional period, from Roman to  
Mediæval times, forms one of the most in-  
structive epochs in architectural art, and the  
introduction of the arch, coupled with the use  
of the dome, and accompanied with abundance  
of sculpture, at once furnishes a highly in-  
teresting chapter in the study of the subject. In  
the South of France Italian influence, too, and  
Byzantine taste have also to be taken into con-  
sideration, enhancing the archaeological im-  
portance of the buildings which now exist of  
this date. Having glanced rapidly at the  
several phases of the architecture of Provence  
during the Middle Ages, Mr. Macgibbon takes  
the reader through the various places visited on  
the way, from Lyons, on the route southward,  
to Marseilles, and thence westward and east-  
ward along the Riviera. Space prevents us  
from following him now on this journey; but  
we can promise a treat to anyone who wisely  
elects to accompany so interesting and in-  
structive a guide. The Palace of the Popes at

\* The Architecture of Provence and the Riviera. By  
DAVID MACGIBBON. Edinburgh: David Douglas, Lon-  
don: Hamilton, Adams, and Co.

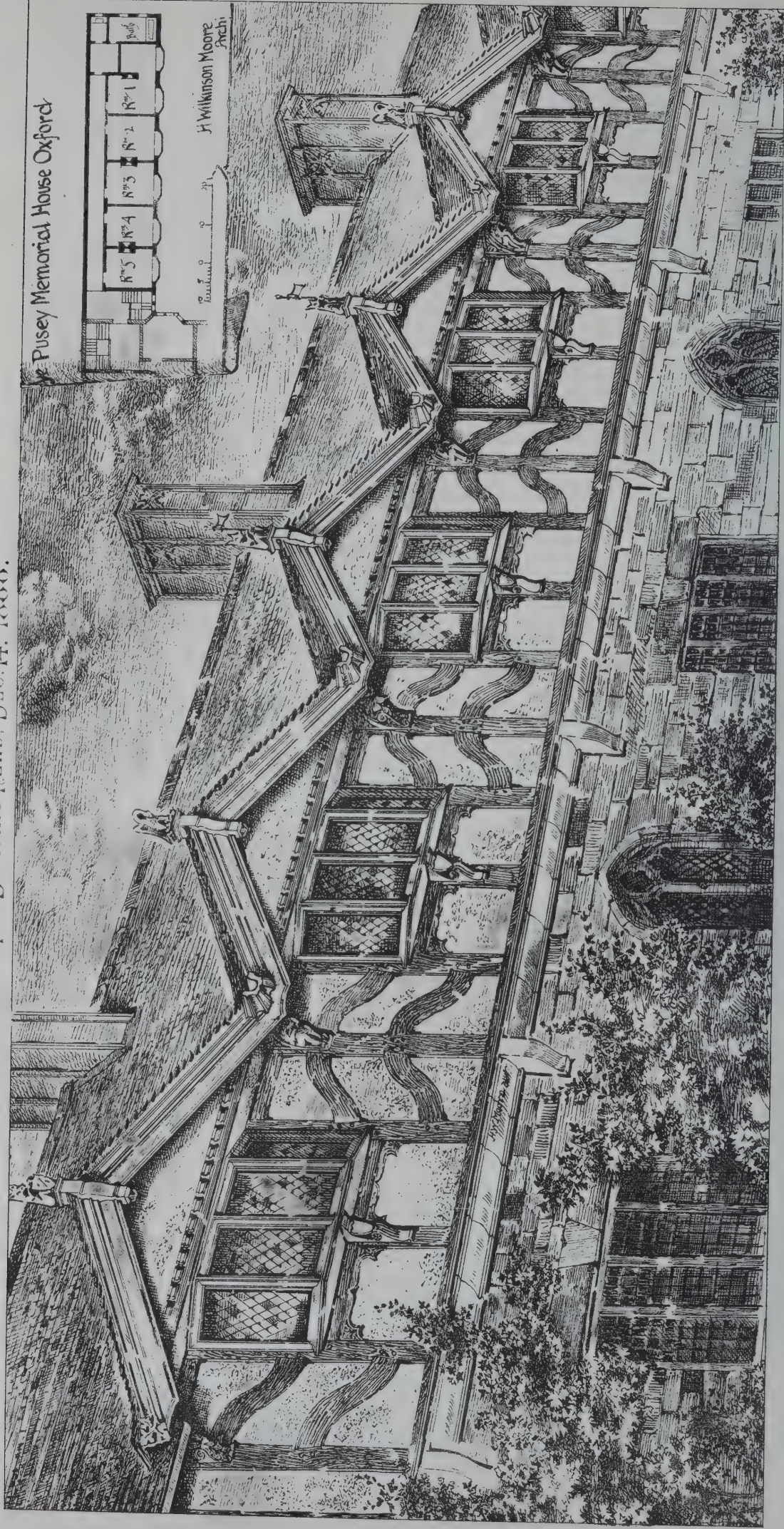
Avignon, the walls of that city, and the  
shepherd bridge of St. Bénézet over the Rhone,  
the Castle of St. André, Villeneuve-lez-Avignon,  
with the church there, and many other archi-  
tectural relics of the place supply materials for  
several sketches at starting. Tarascon, Beau-  
caire, with its curious triangular Keep, and the  
Keep at Mont Majour are among other castles  
visited near Arles, where St. Trophime de-  
servedly attracts attention. Mr. Macgibbon also  
gives two sketches of the Portals of St. Gilles,  
the culminating example of their kind. The  
fortified churches of St. Victor and les Saintes  
Maries, Marseilles, follow, and then St. Sauveur,  
Aix en Provence, with its rich cloister arcade.  
Beziers, on the Orbe, the Cathedral of St. Just,  
Narbonne, and the Castellet Perpignan, which  
rank in importance with St. Nazaire, Carcas-  
sonne, and the stronghold of Aigues Mortes,  
and, like these, are well illustrated. From  
Fréjus, thence branching right and left to Riez  
and St. Tropez on to Cannes, visiting by the way  
St. Césaire and Biot, we go eastward to Venice,  
Nice, Ventimiglia, Taggia, and Genoa, where  
the author leaves us. In the bay opposite  
Cannes lie the two Iles de Lérins, dedicated  
respectively to Ste. Marguerite and St. Honorat.  
Architecturally speaking, the latter island  
possesses the most interesting series of build-  
ings in the Riviera, containing as it does some  
features of the architecture of every period and  
style of Provençal art, whether ecclesiastical  
or civil. Without going into the details of its  
ancient history, we may say that the place was  
deserted in the 5th century, when St. Honorat  
retired to it and there founded a monastery,  
which became famous as the chief repository of  
all learning and education which remained in  
Southern Gaul; and, like Iona, became the  
centre from whence missionaries were sent to  
convert the old barbarians. St. Patrick, the  
patron saint of Ireland, besides many other  
celebrities, were educated here. The church of  
the 11th century, a simple basilica of six bays,  
existed here in part till 1876, when the remains  
were demolished and a modern church put up  
in the Provençal style, without any special  
features. Ste. Trinité is undoubtedly one of the  
earliest antique structures in Provence, and is  
extremely quaint and interesting. In course of  
time the monastery became rich, and was  
plundered by the corsairs of the Mediterranean  
several times. To provide a safe retreat in case  
of future attacks, a castle or keep on a pro-  
montory of rock which juts out into the sea  
at the south side of the island was constructed  
as a perpetual watch-tower. This castle was  
begun by Abbé Aldebert II., in 1073, and in  
1190 the tower was finished. We publish to-day,  
with the author's permission, a general view,  
two plans, a section and two interior sketches  
of the cloisters in illustration of this notable  
monastic stronghold. It differs considerably  
from the feudal castles of the time, and its  
double cloister is a unique feature. From fre-  
quent attacks, and having been sacked more  
than once, it is not easy to trace the lines of the  
original plan. It seems to have been an oblong  
building, measuring 85ft. by 58ft., with a pro-  
jecting wing on the south side. This block was  
divided into two portions by a central wall,  
and in the eastern division contained an open  
cloister, formerly three, but now reduced to  
two stories in height, and in the western divi-  
sion were located the refectory, dormitory, and  
other apartments. To the east a small pro-  
jection or tower contained on the first floor the  
lavatory and latrines, and the top was carried  
up as a watch-tower above the parapet, and  
surmounted by a belfry for the alarm bell. The  
space at the north end of the cloister is a later  
extension of the original keep. The entrance is  
in the north wall, and is reached by steps just  
seen in the exterior view we reproduce from the  
north-east. A narrow passage with steps leads  
to the cloister. This is 40ft. long by 27ft. wide,  
and is surrounded by a vaulted gallery sup-  
ported by six columns, leaving open to the sky  
a central space of 12ft. by 10ft. The ancient  
appearance of the granite columns, with their  
quaint caps and bases, surmounted by bold  
Pointed arches, above which rises the lighter  
arcade; the rich colour of the walls, and the  
unusual character of the work, combine to  
produce a lasting and an impressive effect.  
Some of the pillars are Roman shafts thus  
utilised in the rebuilding; but some were too  
short, and so have been made up with yellow  
limestone of the district. An inscription in





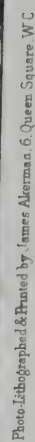


THE BUILDING NEWS, DEC. 14, 1883.





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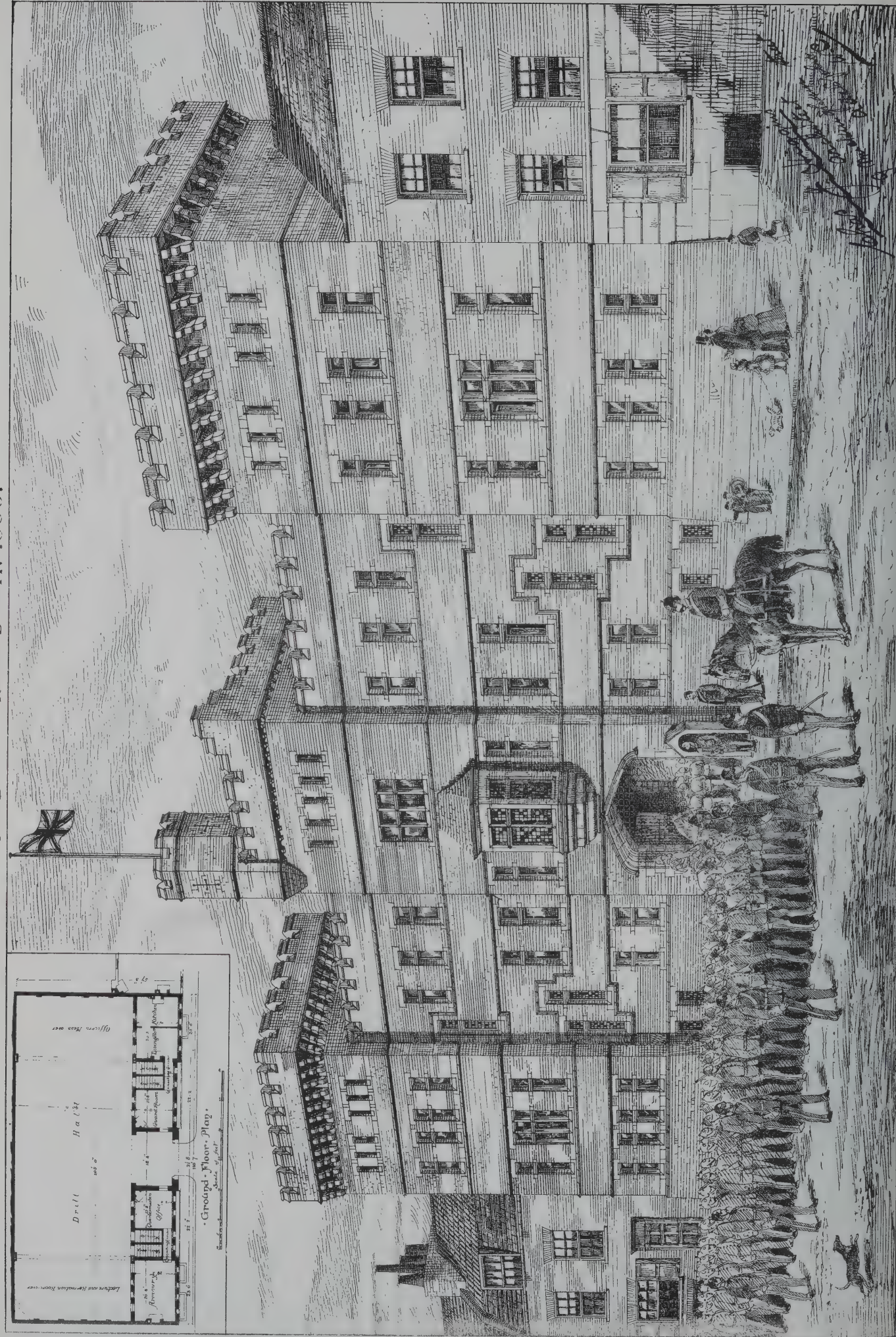








THE BUILDING NEWS, DEC. 14, 1888.

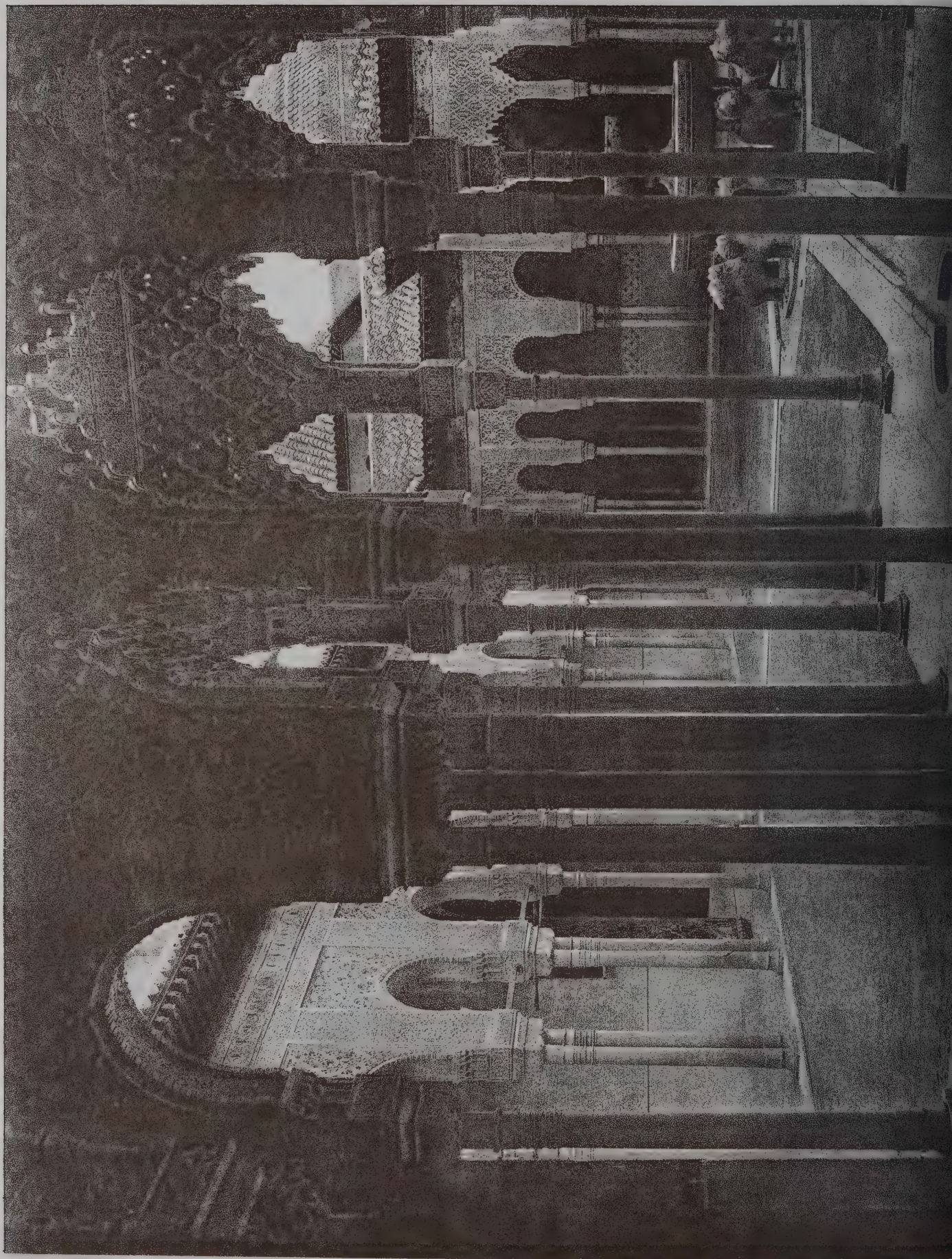




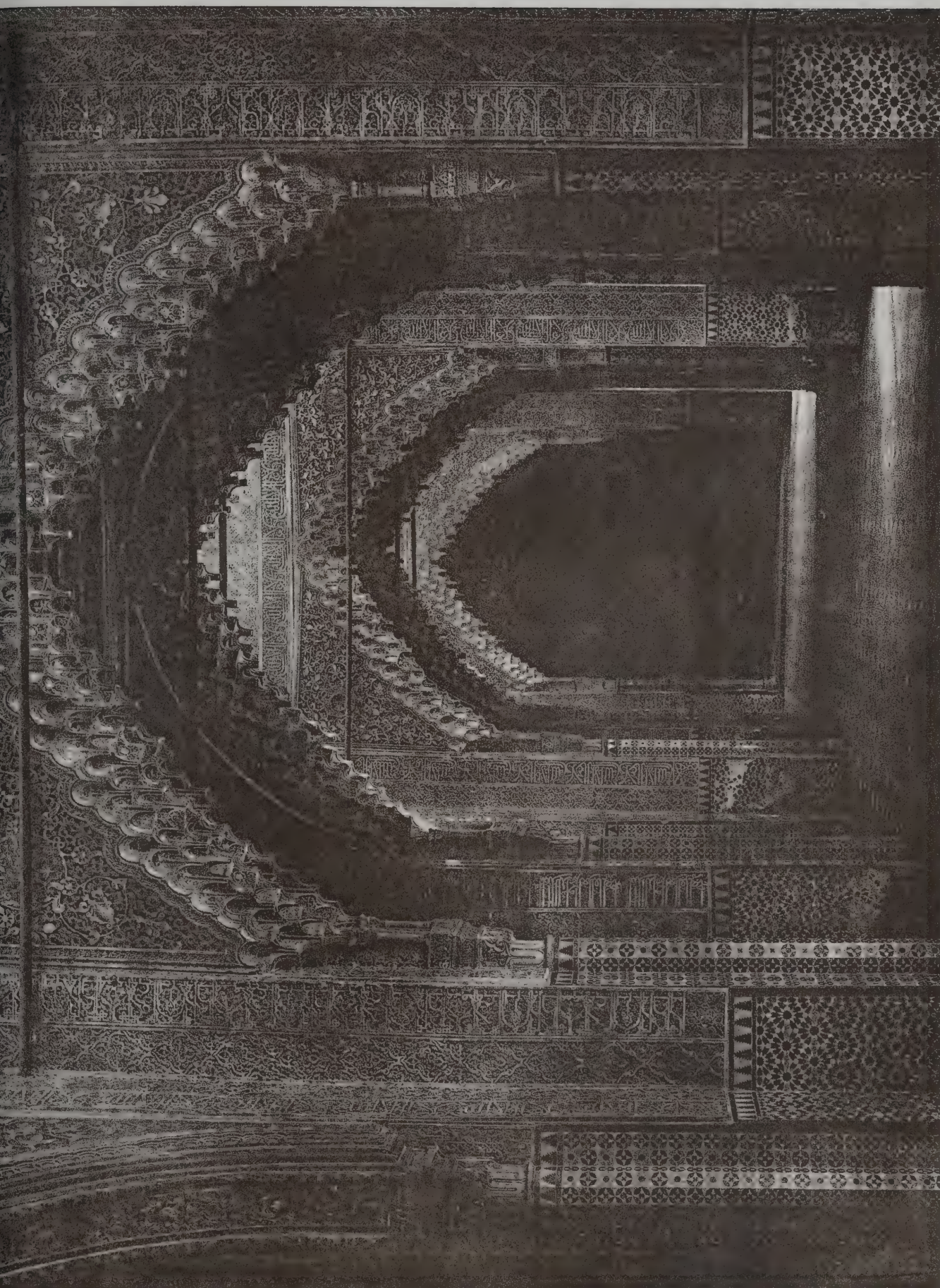




THE BUILDING PEWS, DEC. 14, 1886.







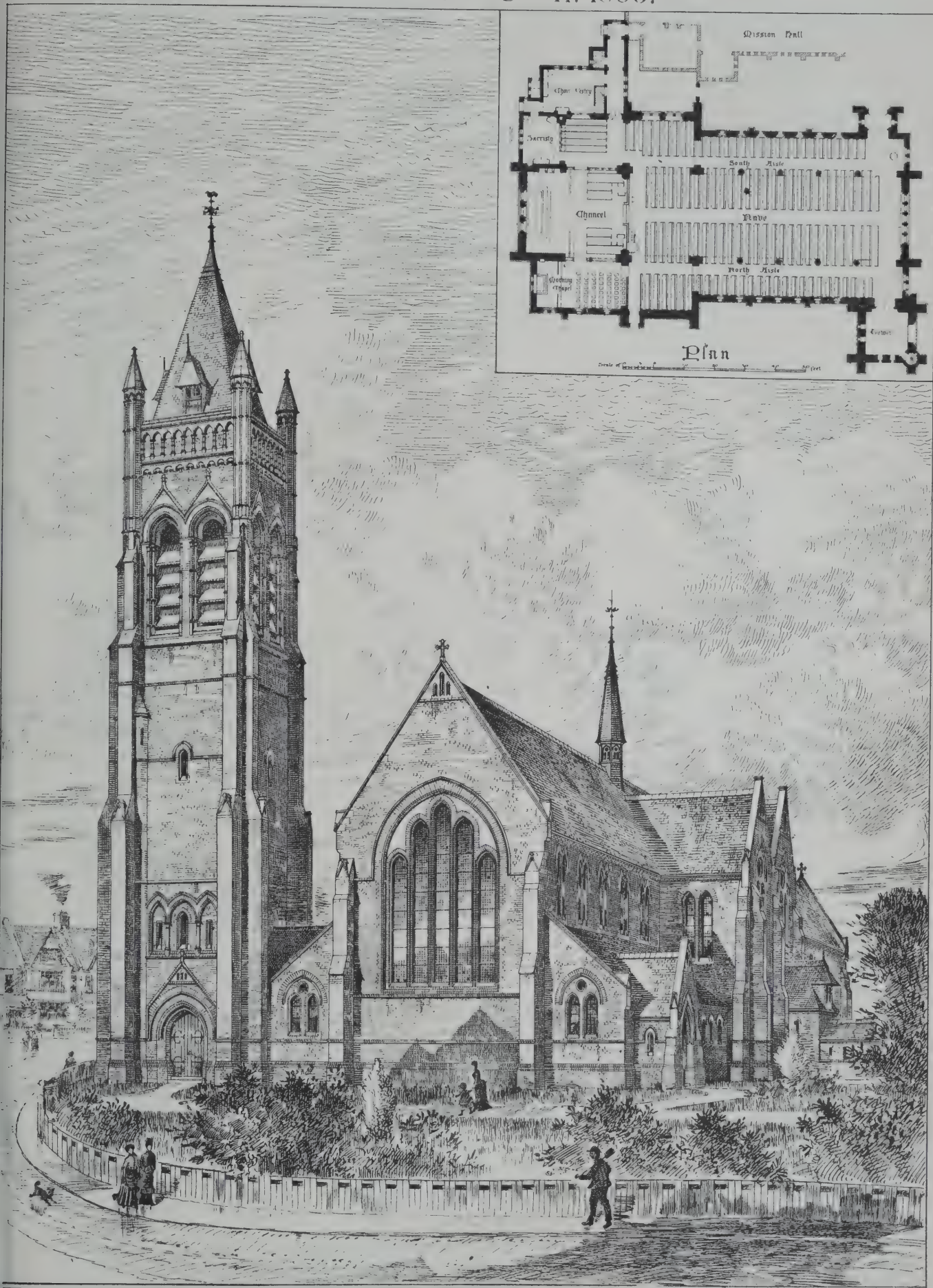
"PHOTO-TINT" by James Abernethy, seen Aqueduct, London, W.C.

TWO VIEWS FROM THE ALHAMBRA















honour of Constantine on the south-west angle pier has been deciphered by Abbé Allier, but it is much worn away by time. The rude and primitive carvings to the caps are attributed to Abbot Gancelme de Mayeris, who, in 1295, did much work here. In 1315 a general Chapter granted fines in order to complete the cloister. In 1400 Genoese pirates took the castle and pillaged it greatly, destroying the building. In the same year another reconstruction commenced, and in 1422 Gastolius de Grasse, its builder, died. Beneath the cloister is a deep well or tank of this date. The upper cloister is built of fine white marble in the Italian Gothic style, and it has a gallery all round it. The chapel is on the first floor, and measures 25ft. by 26ft., with a groined vault about 28ft. high. It is the original chapel, and was restored in the 14th century. The other parts of the building are shown by the drawings, and all are fully referred to in Mr. Macgibbon's valuable book, where many other details are given.

#### PUSEY MEMORIAL HOUSE, OXFORD.

The view shows a new story recently added to the garden wing of the premises of this institution, No. 61, St. Giles's, Oxford, to provide more accommodation for resident members. To avoid overloading the old walls a light constructional treatment was adopted, designed to work in harmoniously with the older buildings. The architect is Mr. H. Wilkinson Moore, of Oxford.

#### SCHOOL-HOUSE, ST. EDWARD'S, OXFORD.

THIS is the most recently-erected portion of the important group of buildings forming St. Edward's School, Summertown, Oxford, all of which have been erected during the last 16 or 17 years, under the auspices of the present able warden, the Rev. A. Barrington Simeon. The school-house is arranged as a residence for a master taking boarders, and has practically all the accommodation of a separate school, including residential portion, extensive domestic offices, together with refectory, school-rooms, and dormitories. The building is executed of red brick, in character with the previous buildings, for which Mr. Wm. Wilkinson (now retired) was architect, the house illustrated being erected from the designs of his nephew and successor, Mr. H. Wilkinson Moore, F.R.I.B.A.

#### HEAD QUARTERS' AND DRILL-HALL, LEONARD-STREET, SHOREDITCH.

THE proposed head quarters and drill-hall for the 2nd Middlesex Artillery Volunteers are to be erected upon the site of seven existing houses on the south side of Leonard-street, Shoreditch, and being Nos. 18 to 30, which are to be pulled down, and upon the open yards in their rear. The building will be faced with red Moreham bricks, and will have stone dressings. The ground floor is to contain armoury, quartermaster's office, guard-room, and porter's living-rooms; basement to have men's lavatories, quartermaster's stores, and store cellars. In rear of the ground floor will be the drill-hall, 109ft. long by 40ft. 6in. wide in the clear, and will have fixed platforms for gun-drill—viz., 40-pounder Armstrong breech-loading gun, and 64-pounder rifled muzzle-loading guns on garrison standing carriages. The other part of the hall will be covered with furnace slag, watered and rolled to a smooth surface to allow for repository work. The hall is to be lighted by a range of lantern lights in the roof, which is to be of iron and wood, slated, and in one span, and is 40ft. in height to the ridge. The first floor of main building will contain the orderly-room, commanding officer's room, &c., and to have two wings over part of hall; the west wing containing officers' mess-room, 40ft. by 21ft., capable of dining 50 persons, and officers' ante-room next the street, 21ft. by 14ft. The east wing is the men's side, having lecture-hall, recreation-room, also 40ft. by 21ft., and sergeants' mess-room adjoining the street; accommodation has been made for a canteen for the sergeants and gunners. The second and third floors are to be used for mess kitchens, &c., officers' lavatories, staff-sergeants' living-rooms, and stores. The works will be started in the early part of next year. The architect is Mr. Chas. J. Higgins, of 9, Buckingham-street, Adelphi, W.C.

#### ST. MARK'S CHURCH, NOEL PARK.

WE this week illustrate a view of St. Mark's Mission Church, which is being erected at Noel Park, Wood Green, from the designs and under the superintendence of Mr. Rowland Plumble, F.R.I.B.A., of 13, Fitzroy-square, W. The building is designed to serve the needs of a new estate of over 3,000 houses and shops, with a prospective population of 20,000, now being developed by the Artisans', Labourers', and General Dwellings Company, Limited. Already over a thousand houses have been built. The church will accommodate 850 people. It is provided with a morning chapel, a large chancel and choir, and ample sacristy and vestry accommodation, communicating with a mission hall which has been already built. In plan the church consists of a nave and side aisles, with transepts on either side, an additional transept at the side of choir and opposite the morning chapel being provided for the organ. The tower shown in the view will not be built until special funds are collected for it. The building is faced externally and internally with red bricks, with red Dumfries stone dressings, the treatment being extremely simple and severe. The builders are Messrs. Treasure and Son, of Shrewsbury. The cost will be £7,000.

#### COMPETITIONS.

**BUXTON.**—The designs for the additions to the Buxton Hydropathic Establishment and Winter Residence submitted in competition by Mr. William Dawes, architect, Manchester, have been accepted, and the first premium has been awarded to him.

**INSTITUTE OF CHARTERED ACCOUNTANTS.**—At a meeting of the Council of the Institute of Chartered Accountants in England and Wales, held on Tuesday last, the designs for the erection of a hall and offices, submitted by six architects who had been invited to compete, were considered, with the assistance of Mr. Alfred Waterhouse, R.A. (who kindly acted as assessor). The plans forwarded by Mr. John Belcher, F.R.I.B.A., of 5, Adelaide-place, London, were unanimously adopted, and Mr. Belcher was appointed the architect to erect the proposed building.

**THE SOCIETY OF ARCHITECTS' ESSAY PRIZE.**—In response to the offer of the Society of a prize of £10 for the best paper submitted during the coming Session, twenty-one titles of proposed essays have been submitted by sixteen architects, and the council have selected nineteen of these as suitable subjects. The papers, which must contain between 3,000 and 6,000 words each, and may be illustrated by not more than five drawings, are to be sent in by the 25th March next, and the one to which the premium is awarded by the council will be read before the Society on Tuesday, May 14th. A wide range of subjects is embraced in the selected titles, the majority being of a practical character.

#### SCHOOLS OF ART.

**ROYAL FEMALE SCHOOL OF ART.**—Princess Christian opened on Friday a new studio at the Royal Female School of Art, Queen-square, Bloomsbury. Her Royal Highness was received by Sir Philip Cunliffe-Owen. In an address read to her it was stated that the school, founded nearly 50 years ago, had long been self-supporting. Exceptional expenditure, however, had been necessary to provide accommodation for the students, and the committee were appealing for a sum of £3,000 in order to complete its extension. Since 1860 2,227 students had received their art education.

The second of a course of illustrated lectures on architecture was given at St. James's Hall, Piccadilly, on Wednesday evening, by Mr. Cecil Orr, A.R.I.B.A., M.S.A., the subject being "Egyptian Art." The lecturer went into the subject of hieroglyphics somewhat minutely, and endeavoured to show that the approximate date of a building could be ascertained by examination and comparison of the symbols written upon it. Numerous illustrations were thrown on the screen by means of a lantern.

## Engineering Notes.

**SOCIETY OF ENGINEERS.**—The thirty-fourth annual general meeting of this society was held on Monday, the chair being occupied by Mr. A. T. Walmisley, president. The following gentlemen were elected as the Council and officers for the ensuing year—viz., As President: Mr. Jonathan R. Baillie (of the firm of Westwood and Baillie); as Vice-Presidents: Mr. Henry Adams, Mr. R. W. Peregrine Birch, and Mr. William Newby Colam; as ordinary Members of Council: Messrs. Chris. Anderson, James Henry Cunningham, George A. Goodwin, Robert Harris, James William Restler, William Schönheyder, William Andrew Valon, and Joseph William Wilson, jun.; as Honorary Secretary and Treasurer, Mr. Alfred Williams; as Honorary Auditor, Mr. Alfred Lass (Messrs. Alfred Lass and Co.). The annual dinner took place on Wednesday at the Guildhall Tavern, City. The President, Mr. Arthur T. Walmisley, M.Inst.C.E., occupied the chair, and was supported by between 90 and 100 members and visitors. The usual loyal and patriotic toasts having been honoured, the President proposed "Success to the Society of Engineers." In doing so he stated that this society had been in existence for more than one-third of a century, and notwithstanding the fact that kindred professional bodies existed, having somewhat similar objects, the society continued to increase in numbers, and now numbered over 400 members. The main object of this society had always been to benefit the younger members of the profession by affording practical instruction in construction, principally by visits to works—a privilege which formed one of the chief benefits of membership in the society. He added that it was incredible to any who had not made the experiment, how much more might be learnt, by the comparison of ideas, when conversing together in a body, while examining work in progress, than when one was left alone simply to inspect. Various papers had been read by eminent authors at the ordinary meetings, and, in his opinion, no just critic of the *Transactions* could charge the society with a want of freshness in the papers read, nor with a desire to exclude subjects profitable for discussion. Every paper read during the session was considered by the Council to be worthy of a premium. The toast was responded to by the Honorary Secretary and Treasurer (Mr. Alfred Williams, the "father" of the society), and was enthusiastically drunk. Other toasts followed, including that of "The President," proposed by Professor H. Robinson, ex-president, and "The President Elect" (Mr. Baillie), proposed from the chair.

#### CHIPS.

The Liverpool magistrates have granted a license to a new theatre situate in Buck-road, Everton. It has been designed and built by Mr. W. Redman, and seats 450 persons.

At a special meeting of the Harrogate Town Council, held on Friday, the final selection of a successor to Mr. E. Wareham Harry, as surveyor and borough engineer for Harrogate, took place. In response to advertisements, no less than 181 candidates presented themselves. A meeting of the council reduced this number to 13, a second meeting to 7, a third to 3, and at the special meeting the voting between Mr. Sead, for nine years assistant surveyor for Bradford, and Mr. F. Bagshaw, of Harrogate, for some time past assistant to Mr. Harry in the surveyor's office, Harrogate, was very close, the result being that Mr. Sead was elected by a majority of one.

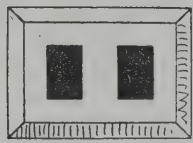
The Bishop consecrated on Friday the new church of St. Stephen in Bird-street, Fishergate-hill, Preston. At present only the nave and south aisle have been built, affording accommodation for 393 worshippers, at a cost of £4,500.

A new Free Church, erected at Barry, N.B., was opened on Friday. The Scottish Gothic style has been adopted for the church, which is cruciform on plan, with a tower 60ft. high at the east end, and a vestry and hall at the west end. Accommodation is provided in the church for 450, and the hall will seat 150 persons. The cost is about £1,700.

A course of four lectures will be given at the Royal Institution by Professor J. Henry Middleton, the subject being "Houses and their Decoration, from the Classical to the Mediæval Period."



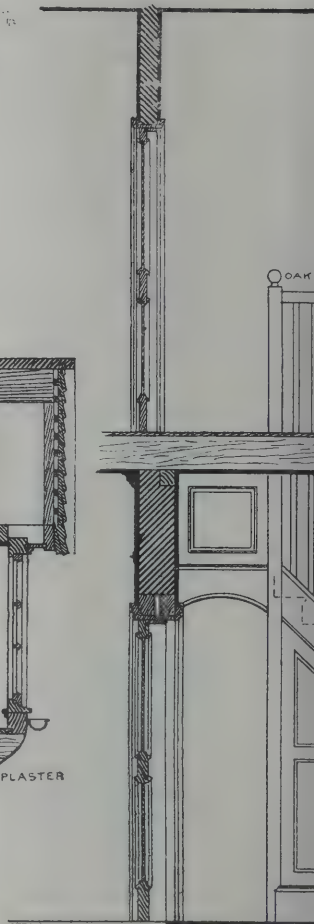
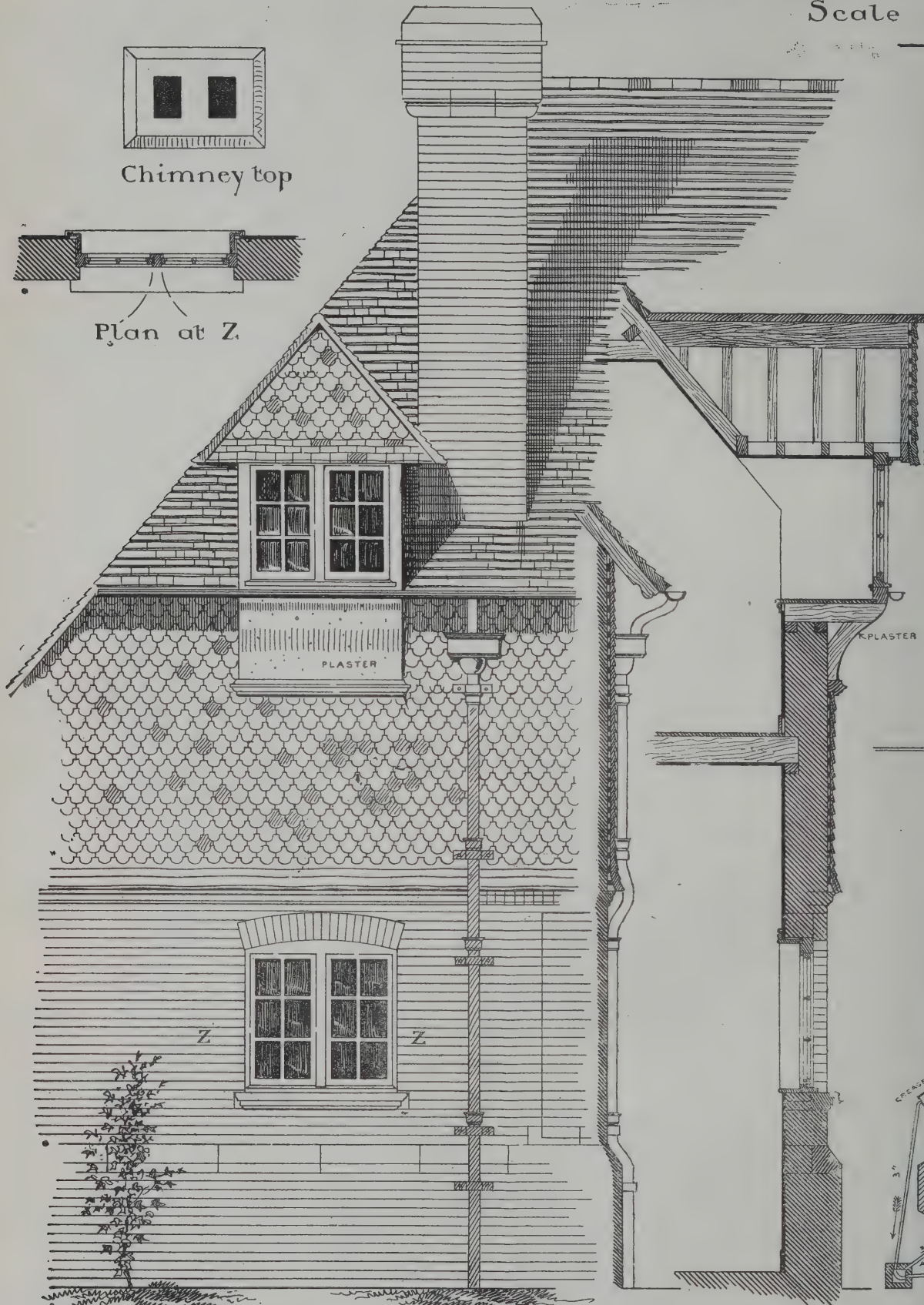
Inches 1 2 3 4 5 6 7 8 9 10 11 12 13  
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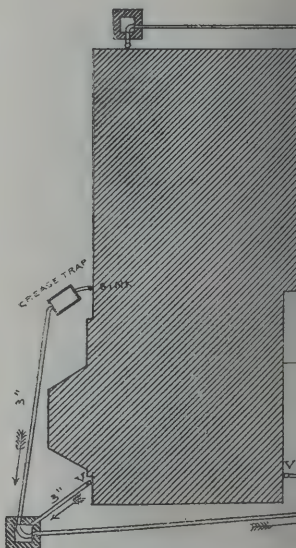
Chimney top



Plan at Z



Longit



Elevation end of Orchard Front Section

# STABLES AND COACHMAN'S HOUSE

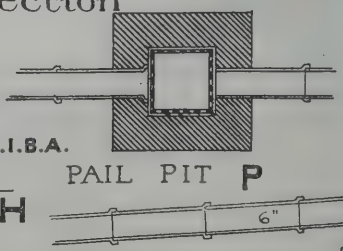
**DETAILS**

Maurice B. Adams F.R.I.B.A.

ARCHITECT

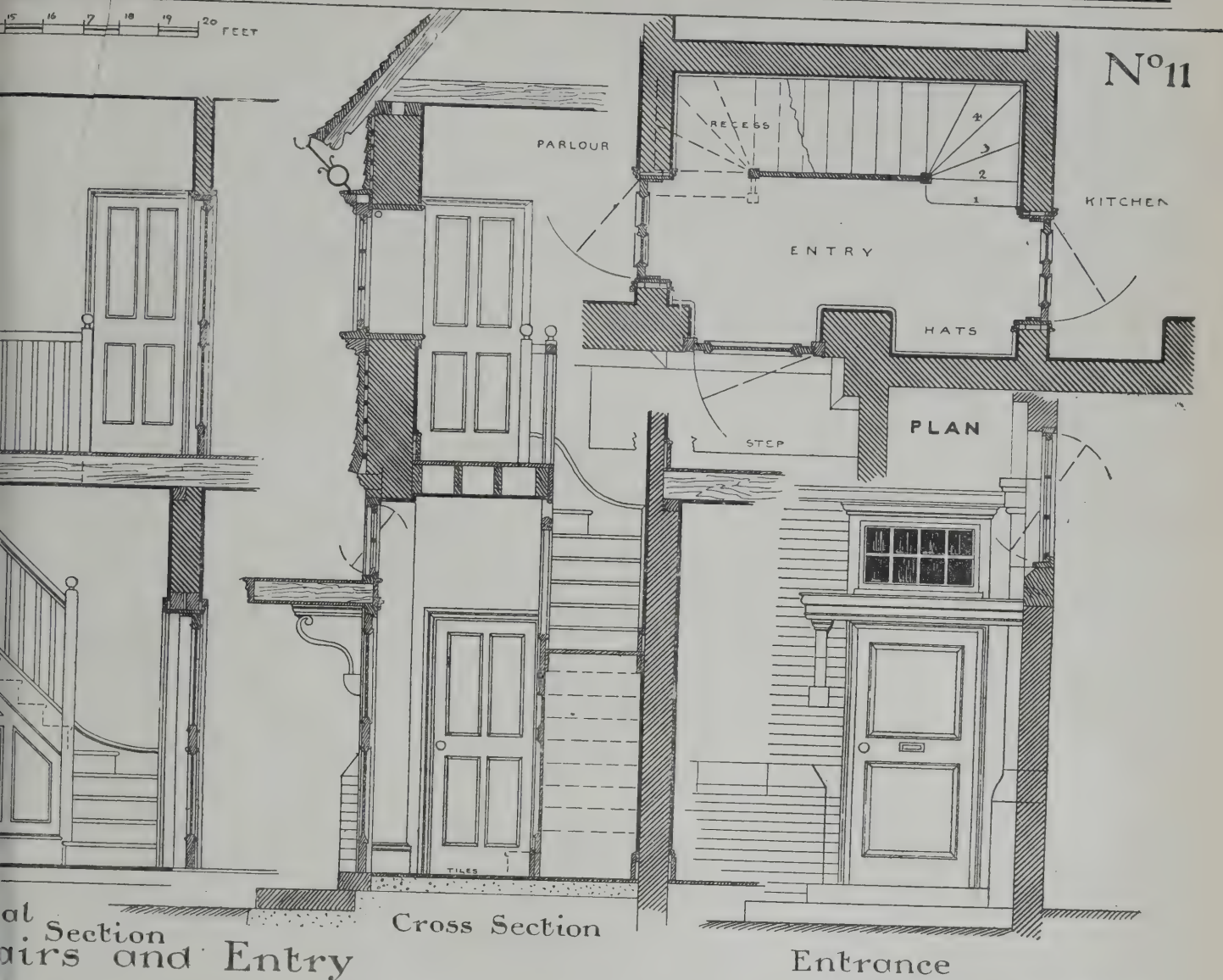
PAIL PIT P

PRACTICAL ARCHITECTURE WITH  
DETAILED ESTIMATES.





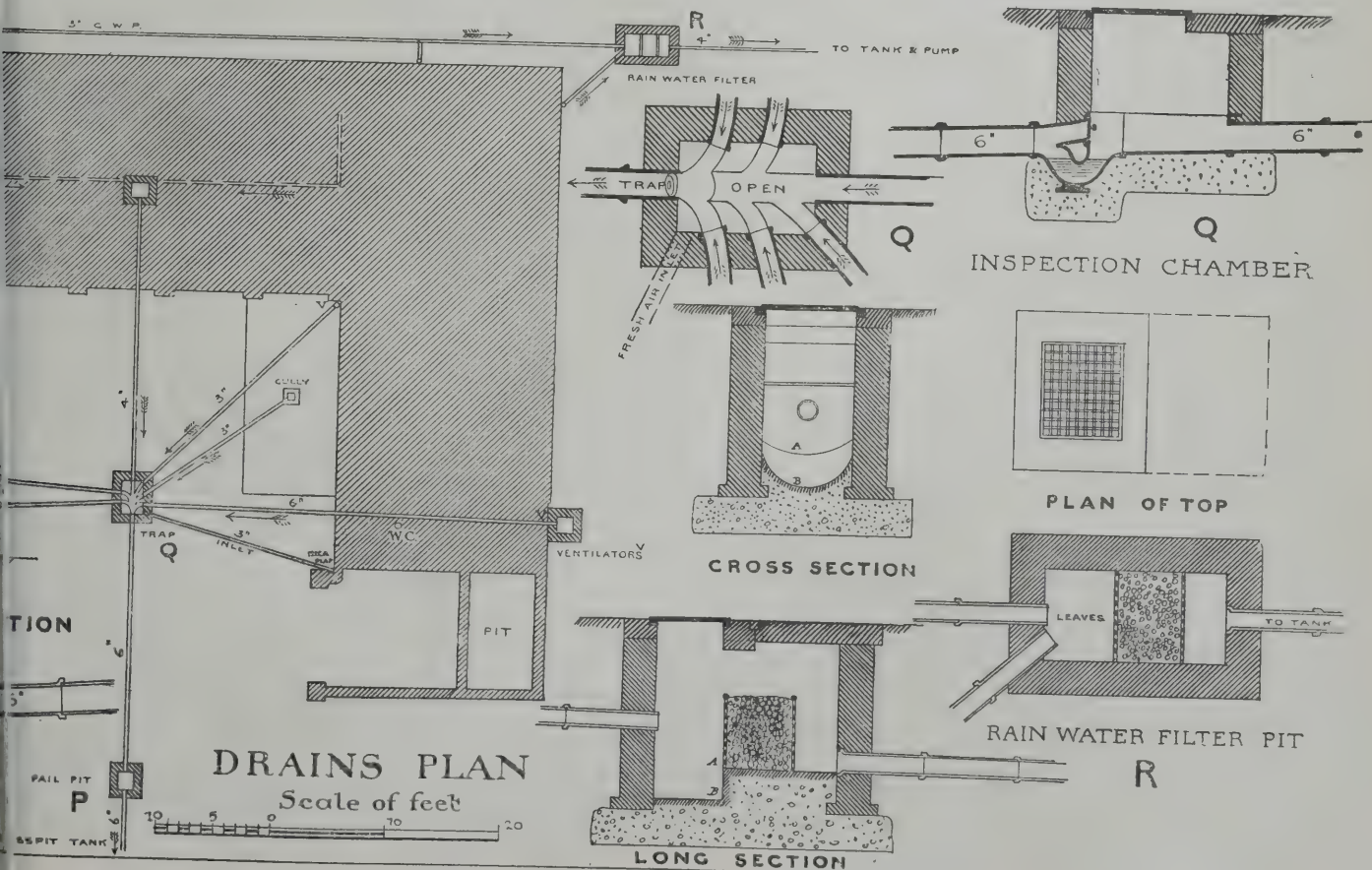
15 16 17 18 19 20 FEET



at Section  
airs and Entry

Cross Section

Entrance



DRAINS PLAN

Scale of feet

CROSS SECTION

INSPECTION CHAMBER

PLAN OF TOP

RAIN WATER FILTER PIT

LONG SECTION



## WAYSIDE NOTES.

THE competition for the new Law Courts at York will be welcomed by very many who have the time and opportunity to enter the struggle. It comes at an opportune moment, as the long winter's evening may well be devoted to competitions by those young architects whose ordinary working hours are otherwise occupied. Not that the youthful section of the profession will stand a great chance of winning a place in this competition, as, being of a promising nature, old hands will be attracted to it, and there will, I feel sure, be a considerable and hotly-contested fight for the laurels; but where there are three premiums of a liberal amount, there is certainly nothing to prevent a young architect making a name as a competitor, and it is better for such, as I have often urged, to throw their energies into a really good competition rather than into a lot of poor ones. And on the face of things this York competition seems to be good. What may be contained in the particulars to be obtained by the temporary expenditure of one guinea, I know not; but so far as the advertisement goes, there is not much to complain of; and what points that do appear as possible of improvement will doubtless seem less objectionable in the light of the instructions. One would almost imagine that the competition was big enough for the dual system; but it is, perhaps, like the goose of an awkward size, too big for the ordinary method, and too small to be cut up. The guinea entrance fee in this instance will not hurt any one, as the instructions may be sent back and the outlay refunded, on the "money returned if not approved" principle. I am glad that what appears to be a decent competition should have been announced before the expiration of the year. It may not be a very large affair; but it appears to be the best that eighteen hundred and eighty-eight has seen, and will see, in all probability.

With only one advertisement to go upon, one cannot pretend to give advice as to the forthcoming competition; but there is one thing that may be suggested, and that is that it will be wise to steer clear of anything savouring of Mediævalism in the style to be employed for these Law Courts. No competitor should dream for a moment of anything Gothic. Needless, I should have imagined, to point this out. With a Gothic building in London, for the accommodation of the blind-folded lady with the scales and sword, which has been abused up hill and down dale, and reviled without measure, and every stone in which must have been anathematised, there would appear to have been little hope of pure Pointed architecture being tolerated for a new Court of Justice. The style must by this time be associated, in the public mind, with inconvenience, intricate planning, and draughty apartments, little as the architect of our own Law Courts may have been to blame. So competitors will do well to wholly eschew any phase of Gothic for the York building, even though the old cathedral city, with its churches and ancient ramparts, may appear to be steeped in Mediævalism. In competition for Courts of Justice, it would be wise, for the next few decades, to discard the Gothic style in its entirety, or if an arcuated design must be adhered to, to so disguise and modify it that it may be as far removed in character as possible from that beautiful, much-maligned, public-offending, and architect-pleasing edifice on the extreme western boundary of the City of London.

The site for Mr. Chas. Wyndham's new theatre is now, it is said, definitely decided as the corner of Windmill and Denham streets in Shaftesbury-avenue, and in the last-named thoroughfare will be placed the principal entrance. The Avenue will be well supplied with theatres before long. In a few days' time the Lyric will be opened—an elaborate building internally, according to all accounts. Mr. D'Oyly Carte's new theatre is progressing. As a set-off against the large number of new buildings being erected, Her Majesty's is to be pulled down. The old opera-house appears to me to be, amongst its fellow-theatres, what the *Great Eastern* was amongst ships: it is altogether too unwieldy and, like the steamship, never seems to have been "run" with financial success. The

landlord abhors vacuity as much as nature, and the space left by the clearance of Her Majesty's will be occupied by a large hotel and a little "bijou" theatre. I suppose this means another mammoth building of a kind with which we shall soon be pretty well supplied in our little village.

The lecture season is now well under way, and opportunities held out to the student to improve himself are many and varied. Messrs. Middleton and Orr's new venture is much to be commended, and I trust the discourses at St. James's Hall will be as well attended as they deserve to be, and that they will receive the due support of the public. Whether or no the latter can ever be brought to appreciate true architecture, they have now many opportunities for becoming acquainted with facts and principles. Of late years the amount of lecturing, for the public, on matters architectural has increased ten-fold. Much has been forced upon them "willy nilly." There have been a gradually increasing number of architectural lectures at the learned institutions. But the course to be given at St. James' Hall is perhaps more systematic than hitherto attempted. With the birth of the National Art Association we may really hope for better things in the way of public appreciation of architecture—in the dim future, at any rate. For the architectural student proper, there are this season an abundance of lectures, not counting the instructive discourses at his own A.A. and at the other architectural societies. Really, the "poor student" must have disappeared, as classes, lectures, &c., of all kinds are ready to be joined for a very trifling expenditure, and the rapid multiplication of free public libraries puts within everyone's reach many valuable treatises on building and architecture not otherwise attainable. By the bye, the lectures at the Royal Institution this season will include a course by Mr. J. H. Middleton on "Houses and their Decoration, from the Classic to the Mediæval Period."

Another Roman villa!—at least, I conclude it is a "villa," although at present the only announcement made has reference merely to a Roman pavement, "composed of red tiles and white stone," that has been unearthed at Furzebrook, near Wareham, and about a mile from Corfe Castle, Dorset. The foundations of a large building and fragments of coin, pottery, bones, &c., have been found. Roman discoveries follow one another so rapidly in this country that one is led to reflect that there must be a wealth of old workmanship yet remaining. It is to be hoped that the discovery at Furzebrook has been made by a liberally-minded person, who will allow visitors to sketch. When I visited the then newly-found Roman villa at Brading, in the Isle of Wight, I remember the surly looks of the personage in authority, who would not allow one to sketch a fragment. What steps he would have taken had any visitor persisted in drawing the remains, it would be difficult to say. Most likely the size and weight of the sketcher would have been taken into consideration.

There is no question that more urgently demands attention from the future county councils than that of the demoralising effect of jerry-building on the community at large. We may well look up to the French in the matter of sound buildings, even if actual sanitary detail is much neglected on the other side of the Channel. Although Mr. Francis Hooper pointed out some of the drawbacks to the absence of the leasehold system in France as we know it, in his recent paper at the Institute, the French escape many of the serious evils that befall the small English householder. Our future county councils might well learn a few lessons in building administration from the Parisian authorities. In London, especially, we badly want a *Conseil d'Architecture* and better men to advise us on practical questions. In Paris, educated men undertake the decision of questions of vital importance in connection with architecture, practical and artistic. In our own capital we have for years past had such matters supervised by tradesmen, and the architect has, I am told, been under the thumb of—if not bakers or candle-stick makers—a bootmaker!

GOTH.

## THE MAINTENANCE OF MACADAMISED ROADS.\*

By W. HEWITT.

(Concluded from p. 763.)

I HAVE not gone into the cost of labour or material in anything referred to in this paper, as they vary so much, even within a small radius, that such details would be of little practical value. The length of road which a surveyor can well superintend must depend to a great extent on the nature of the roads and the situation of them. It will be found more economical in all ways to have districts of such a size that a sufficient sum may be paid to a surveyor as will enable the authority to obtain a competent man, and allow him to keep a horse. In this case, he could look after a much greater length of roads if he had two or three assistants, and a uniform system of maintenance over a large area is much to be preferred to small divisions. Extraordinary traffic, as defined by the Highways and Locomotives (Amendment) Act, 1878, has caused a great deal of trouble and annoyance. It is frequently very difficult to tell what extraordinary traffic is, and when it commences. It is much to be wished that some clearer definition of what constitutes extraordinary traffic had been given in the Act, and that due notice of such traffic had been made compulsory, unless the traffic should be thrown on the road unexpectedly through an emergency. Such notice cannot be reasonably expected until extraordinary traffic is more clearly defined. Extraordinary traffic thrown suddenly on a road, which is amply strong enough for the ordinary traffic of the district, will frequently destroy the surface of the road, often ploughing down into the sub-soil and cutting the road completely to pieces. In many cases, if due notice had been given of the intended increase in the traffic, the road might have been strengthened so as to have borne it with little or no injury, and at a very much less cost than the after-repairs which were required to bring it into good order. I think the abolition of turnpike trusts in England and North Wales was a great mistake, until some better method had been found to obtain funds for road maintenance. Then everyone who used the road had to pay for it, but now the burden falls almost altogether on one class—viz, the farmers, especially in agricultural districts. From inquiries which I have made in South Wales (where turnpikes still exist) at gates close to large towns, eleven-twelfths of the traffic which passes through them comes from the towns; and even at country gates, six or eight miles from any town, three-fourths come from the towns. It is manifestly unfair, then, that the county ratepayers should have to pay the whole amount for the maintenance of roads which are much more used by the townspeople than by themselves, and to this cause, I think, may be attributed the dissatisfaction which exists in the country as to the Highways and Locomotives (Amendment) Act, 1878. These remarks are intended to apply to main roads only, and not to district or parish roads. The inferior state of a great part of the main roads may also, I believe, be traced to the same cause. The greater part of most highway district boards is generally composed of farmers, and they naturally try to reduce the expenditure on the roads to as little as possible, and in many cases have done so to too great an extent, and the roads have suffered in consequence. The tendency is also to divide the present highway districts, which in many cases are already too small, and place each division in charge of a man who knows nothing whatever about road work, the salary offered being so small that no competent man could accept the appointment, a great many highway surveyors at present having had no previous training in road work whatever. I think this is a great argument in favour of the county government of roads. The districts should be of a large size, and the surveyors should be appointed by the county authority, and be required to devote the whole of their time to their duties. District boards would be required to regulate the expenditure, and I think it advisable that all main roads should be either under separate management, as in

\* Read at the Ordinary General Meeting of the Surveyors' Institution, Nov. 26, 1888.



Wales, or be inspected by an officer appointed by the county authority; or several authorities might combine to pay an inspector, and he should deliver an annual report on the state of the roads, and superintend the preparation of the estimates. Under the South Wales Turnpike Act, the main roads of each county are governed by a County Roads Board, with, in some counties, District Roads Boards, as distinct from Highway District Boards, to regulate the expenditure. The surveyors have charge of the main roads only. The highway district surveyors are also appointed by the County Roads Boards, although not paid by them, and they have charge of the district and parish roads. Until recently, the main roads were annually inspected by a general superintendent of roads for South Wales, appointed and paid by the Local Government Board. This office has recently been abolished, as the loans advanced by Government to the respective County Roads Boards when the Act was passed, have been repaid. In many of the English counties the main roads are inspected; but in many cases it is either by magistrates, county surveyors (who are usually architects), or police superintendents, &c. These may know very well when a road is in good or bad condition; but they cannot know, unless they have had special training, what is the most economical and best way of repairing a good road and maintaining its efficiency, or of repairing and making good a bad one. A great deal has been said lately as to how funds should be obtained for the maintenance of roads if the present system of inspection should be abolished. In my opinion, the fairest way would be by the appropriation of the carriage tax, and if that did not prove sufficient, by the reimposition of the horse-tax. Vehicles and horses, whatever they may be used for, should be taxed. In the case of vehicles, the tax should be adjusted on the basis of the tolls which were levied under the Turnpike Act, due regard being paid to the condition and shape of the wheels. It may be said that in this case the townspeople would have to pay towards maintaining the country roads, whilst the country people would not pay anything towards the maintenance of the town roads and streets; but I think this objection may be met by providing that the tax should be divided proportionately and applied to both purposes, certain of the streets for this purpose being classified as main roads. Since the preceding paper was written, now nearly five years since, the Local Government Act, 1888, has been passed, and in Clause 20 it provides that all local taxation licenses, as specified in the first schedule to the Act, are to be paid into the Bank of England to an account called the Local Taxation Account, after which, when the respective amount collected in each county has been ascertained and certified by the Commissioners of Inland Revenue, it is to be paid, under the direction of the Local Government Board, out of the Local Taxation Account, to the County Council of each county. This schedule, in addition to others, includes licenses for carriages, trade carts, locomotives, horses, mules, and horse-dealers; and in Section 21 a temporary provision is made by which, in addition to part of the probate duties, all duties on these licenses under any Act of the present session are to be applied as a grant, to be distributed as follows:—"In paying to every county, highway, and other local authority, who have heretofore received out of the moneys provided by Parliament a contribution towards the cost of roads, or to the successors of such authority, sums calculated in like manner and according to the like scale and regulations as the financial year ending on the thirty-first day of March, one thousand eight hundred and eighty-eight." A great outcry has been made against the projected wheel-tax [withdrawn before this paper was read]; but it was not to be expected, as people who have previously benefited by the taxation of others do not care to have the burden thrown entirely on their own shoulders. The usual argument against it is that the roads are of the indirect benefit of all. This is quite true; and, therefore, all the more reason why a more equitable mode of obtaining funds should be provided than at present exists, by which the whole cost of maintaining the county roads is thrown chiefly on the agricultural classes. I strongly hold that those who obtain a direct benefit from the use of the

roads should pay directly towards the cost of their maintenance. At present it is difficult to judge how the Act will work in relation to main roads. In South Wales, all tolls will be abolished from the date it comes into operation, and funds for their maintenance will be obtained in a similar manner as in England and North Wales. The general opinion in South Wales is that under Section 11, Clause 2, the various urban authorities will take possession of the various lengths of road within their districts, thus leaving many short isolated lengths, which will be transferred by the County Councils to the various highway districts under Clause 4 of the same section. The proper maintenance of all these roads will be supervised by the road surveyors of the Councils of the different counties, and all payments to the bodies who have taken over these roads will be made on their certificates. It seems probable that the district roads there, which stand on a somewhat similar footing to the main roads in England, and receive a contribution from the common fund of the county, will all be declared main roads under the Act. No special provision has been made to meet this as far as I can see, but it seems to be the evident intention of the Act. In England a similar course seems likely to be taken as regards the absorption by urban authorities of main roads in their districts. The proper supervision of the main roads seems well provided for by the Act, as by clause 5, section 11, no County Council has power to make any payment to a District Council in respect of the maintenance, repair, or improvement of any road by an urban authority until the County Council is satisfied by the report of their surveyor or such other person as they may appoint for the purpose. While the more efficient control and maintenance of the main roads appear to be well provided for, the importance of the proper maintenance of district and parish roads should not be lost sight of.

#### THE SOCIETY OF ARCHITECTS.

THE second ordinary meeting of the Society was held on Tuesday evening at St. James's Hall, Piccadilly, Mr. H. Roumieu Gough, Past-President, in the chair, when there was the largest attendance of members and friends yet seen. The following new members were elected:—Edwin Mordaunt Fayle, 16, Bagwell-street, Clonmel; Henry Davidson Hatfield, 8, Balham-grove, S.W.; and Cecil Orr, A.R.I.B.A., M.R.I.A.I., 32, Montagu-place, Russell-square, W.C. Mr. Edgar Farman moved "That the council be instructed to consider whether it be advisable to appoint local honorary secretaries throughout the country." This was seconded by Mr. ALEXANDER PILBEAM, and carried unanimously.

#### THE ARTS AND CRAFTS.

Mr. WM. WOODWARD, A.R.I.B.A., P.A.S.I., read a paper on "The Arts and Crafts, from an Architect's Point of View." The fine arts more immediately within the jurisdiction of the architect, he said, painting and sculpture, and, of course, architecture; but an acquaintance with the other two fine arts—music and engraving—the architect, as a man of taste and a lover of the beautiful, will find of service in the practice of his profession. As regards painting—and I here mean the higher branches of that art, and easel pictures, as distinguished from decoration—the architect's share is in the provision of adequate and proper light, in selecting the portions of the design for treatment by the painter, and in so controlling the decorations that the work of the painter is not in any way marred. For the sculpture he will determine as to the pedestals, niches, galleries, and other parts of the building in which it is to be placed, so that distortion may be avoided and the sculptor's art aided by the architectural accessories. A knowledge of music will lead to a stronger regard for acoustic success, and for the correct disposition of the organ in churches. A study of the engraver's art will lead, may be, to inspiration in light and shade, and to suggestions in design and draughtsmanship. The crafts within the control and jurisdiction of the architect are the whole of the building tradesmen, from the excavator to the decorator. We thus find that the field over which the talents of the architect are to be spread are

very large. We can appreciate the skill required in bringing to a successful issue the exercise of those talents, and we must acknowledge the influence upon the history of nations which the architect has always had, and which he will ever have. Does it not, then, behoove us all to work diligently and conscientiously in the acquisition of the required knowledge, to put down with a strong hand all that is spurious in art, to decline to respond to caprice and passing fashion, to absolutely refuse to worship false gods? I will not now speak of education in the fine arts further than this, that I believe the education of the architect is receiving more and better attention than has hitherto been bestowed upon it, and that the whole modern tendency is to make him master of the arts, as well as master of the crafts. The architect is dependent, for the realisation of his schemes, upon the craftsman; a question therefore of great moment to him is this: Is the craftsman of to-day master of his trade? In this country, in former generations, a craftsman attained to competence by reason of a complete system of apprenticeship—the boy, brought up perhaps in his father's workshop, commenced at the lowest round of the ladder and gradually but effectually attained to the highest—he had not the professor or the technical school at his elbow, he had not the inducement of prizes and certificates thrust in his face; but he had what was of much greater importance, the self-reliance induced by mastery over his craft, the solid knowledge conveyed by the old craftsman, the honest determination to perform the best work which his hand and brain would permit, and in the place of the certificate and the prize he went to his rest contented with the thought that a work for posterity—a work to the honour and glory of his Creator—had sprung from his fingers. To-day many of the men who engage themselves as craftsmen have not, in the true sense of the term, been taught their trade at all. A man lays one brick upon another and terms himself a bricklayer; but set him to cut an arch, a dome, or a niche, and he will probably regard you with a look of surprise or disgust. This applies also to many other trades. Men accept work as carpenters, joiners, and plasterers who have no right whatever to the honourable titles, and their ignorance, blundering, want of eyes, and indeed of ordinary intelligence is discovered when too late, at the cost of the client, and at the loss of reputation of builder and architect. I believe that the trade of the plumber is the only one in which anything like the old system of apprenticeship is carried out. In the opening address of the Plumbers' Congress at the International Health Exhibition of 1884, Mr. George Shaw, the Master of the Worshipful Company of Plumbers, made the following quotation from the Ordinances of the Plumbers' Company, which date from Edward III. "That no one of the trade of plumbers shall meddle with works touching such trade except by the assent of the best and most skilled men in the said trade, testifying that he knows how well and lawfully to do his work, so that the said trade may not be scandalised, the commonalty damaged and deceived by folks who do not know their trade"—and a later ordinance provides that: "No one shall take an apprentice unless a householder and is exercising the craft, so that the apprentice may have his sufficient finding, instruction and learning in the craft." We thus see the care bestowed in early days on the education of the plumber; we may reasonably conclude that similar care was exercised in the other trades, and we are not so much at a loss to account for the splendid work of the craftsman of five centuries ago. There can be little doubt that, with the ordinances I have quoted, bad work was well-nigh impossible; and it might be well-nigh impossible now if a systematic and, indeed, compulsory form of apprenticeship were brought to bear on all tradesmen. The public outcry against the bad work of the British workman has of late years been very prominent; oft-repeated complaints reach us that our workmen are much behind those of other nations, both as regards design and execution, and the result has been that a school of professors in technical instruction, professors of design and construction, and professors of sanitation has sprung from the ashes of discontent. I do not propose to lay much blame at the doors of these gentlemen; I



believe that, as "professors," they have done their work remarkably well, that they have honestly endeavoured to make themselves acquainted with the true principles of the arts they profess, and to communicate that knowledge to their pupils. But, in my opinion, a greater mistake could not be made than to conclude that, because of the existence of the professors and their schools, the practice of the arts and crafts was somehow to be brought to the perfection of the early days, and that what reads so well in official reports was really an indication that our workmen were, at last, again becoming masters of their trades. It cannot be denied that facility of drawing and careful and exact modelling has been secured; but the exhibitions of the prize-winners at these schools have of late years horrified one at the lack of ingenuity and at the want of thought and originality displayed. Where the student has wandered for a moment from exact reproduction of his models, he has lost himself in crude and unmeaning designs. Glaring ignorance of planning and construction has characterised the architectural displays. Modelling from life has succeeded; but one has looked in vain for the least satisfactory evidence of invention or design in sculpture. Designs for textile fabrics, whilst showing much beauty of delineation, have failed altogether in character and in original conception; and painting and decoration, when wandering from pure copying, have either shown lamentable poverty in outline and in colour, or a slavish following of the passing fashion of the day, regardless of its weaknesses and of its absurdities. In France the education of the craftsman is on a much better footing, and the State requirements are far more exacting. In 1878 I visited in Paris the Cercle d'Ouvriers des Maçons et Tailleurs de Pierre, and I was much struck at the system of education adopted there. In one case I saw some young masons working out in chalk—about a quarter full size—a winding staircase; in fact, performing in the evening school in chalk, under the eyes of skilled workmen, what they would be called upon to do during the day on the building—there was the absolute work on a smaller scale, and all the constructive and geometrical difficulties were laid bare. I was told by one of the directors, who was a priest, that previous to this practical work the students were required to devote the evenings of three whole years to geometry. I was agreeably surprised when the priest drew aside a curtain in the school and disclosed a little chapel. There was also a doctor connected with the school, and a sick room for those in need of it. Thus the educational, the physical, and spiritual wants of the lads were provided for. In some of the schools in France the works of the students are sold to the public. This is a great incentive to the student, who is much more likely to throw his soul into his work when he believes that it is to be utilised, than when he knows it is to be broken up as so much wasted material. Apprenticeship, as we understand it, does not exist in France—that is to say, the legal and binding part of it—the workman learns his trade in the workshops, but he claims the right to shift when he pleases, and the master claims the equal right to dismiss him when he pleases. Let us now for a few moments contemplate the craftsman on the building—that part of our labours which to us is of the deepest moment, that place upon which our works are judged; the concentrated and culminating point of the arts and of the crafts. I do not propose to occupy your time in detailing the numerous examples of the craftsman's errors which have come under my notice. You in your practice have not been free from them, but whilst admitting that there are foremen and workmen who constitute striking exceptions, I say that, as a rule, unpardonable blunders, inaccurate and defective work, painful evidence of uneducated eye and hand, insufficient technical skill, combined with laziness and downright cussedness, are the chief characteristics of the average British workman. The architect, clerk of works, or foreman must leave nothing whatever to the independent discretion or thought of the workman; he must draw out and direct in the minutest manner every trifling matter about which the least interest is felt, and must not only closely watch the workman in executing it, but must almost

execute it for him. It has at times been to me a subject of complete astonishment that little matters clearly appertaining to the workman himself, about which I concluded that it was not possible that he could go wrong, have come out glaringly devoid of the least intelligence. And this becomes doubly annoying when it is known that the cost of making good the culpable blunders, and the defective workmanship falls not upon the only man who is directly to blame, but upon the builder if it is contract work, and upon the client if it is day work; and when one adds that the reputation and peace of mind of the architect are often through this cast to the winds, it may fairly be said that the proper education of the craftsman, before he is allowed to exercise his talents upon the building, is a matter of supreme importance to the public and to the architect. Last year I visited the East London Industrial Exhibition at the People's Palace. I went there with the idea that I should find interesting specimens of each man's home labours, because that was the particular kind of work which was, I believe, invited. I thought the bricklayer would show what he could do in skilful bond work, or in cut, rubbed and gauged work; that the mason would exhibit some delicate piece of tracery work in stone, involving more than usual care in its production; that the carpenter would show his knowledge of perhaps the principles of the roof truss, with some specimens of original framing and construction; that the smith would show us some hammered iron, competing with the work of Huntingdon Shaw, of Nottingham; the plumber some example of wiped joints, bends, and traps, the work of his own hands, and so on. But what I saw was that a worker in brass had made in brass a small Chippendale cabinet, with panels of silvered glass, above all things in the world; that another had in his spare time, with a pocket knife, turned out some very badly designed and equally badly executed picture frames—he would have done better to have discarded his pocket knife and availed himself of the better appliances within his reach. A shoemaker with a "knife and hasp" had constructed a flower box for a window sill; it represented a dwarf wall surmounted by the usual iron spearhead railings, but as he had taken into his head to form two steps down from the centre little gate, and had not correspondingly brought the dwarf wall to the lower level, the said dwarf wall must have rested on air. And so in many other cases men had left their own trades, and gone out of their way to produce execrable designs and silly work. Instead of the craftsman producing specimens of his own handiwork, we were favoured with these "done-with-a-common-penknife" productions, indicative of nothing but a shameful waste of time. The lecturer then referred to the recent exhibition of the Arts and Crafts at the New Gallery. He remarked that he much admired the general idea of the exhibition detailed—particularly the plan of making public the names of the craftsmen as well as of the designers—giving, in fact, to each his due. He selected for notice the names of Mr. Walter Crane, Mr. E. Burne Jones, Mr. Wm. Morris, and Mr. J. D. Sedding because their productions occupied a considerable portion of the exhibition, and, from their prominence, these gentlemen were likely to greatly influence those who might not yet have arrived at that stage when they were able to distinguish the good from the bad in art—when they were able to correctly estimate the value of the production as distinguished from the name attached to it. Mr. Woodward's criticism on all four artists was trenchant and unsparing. Thus, he referred in detail to the hesitating and weak modelling, to the disproportion in balance of composition, to be seen in Mr. Walter Crane's recent works, remarking that much of the fault in his designs was due to haste; his vigour, balance, and original conception were lost in the multiplicity of his productions. If Mr. Crane desired to found a school of the arts and crafts, which should rise above the tame effeminacy of modern thought, and disregard the caprices of a passing fashion, he would, the lecturer held, do well to place a limit upon his labours, and thus be better able to lead the attack with that strength and boldness which came to quiet and deliberate work, void of haste and weariness of soul.

In the work of Mr. E. Burne Jones, Mr. Woodward found nothing like so much to admire in the midst of much to condemn. He confessed that much of Mr. Burne Jones's work was quite beyond his grasp, and altogether outside his understanding of what constituted art. In his work all was mystery, his symbolism and his allegory were far beyond comprehension; the canons of taste which guided one hitherto lost all their force, and the lecturer said he helplessly contemplated works which he could not understand. Of Mr. Burne Jones's cartoon for the "Nativity," Mr. Woodward remarked: I have hitherto understood this to be the coming into the world of Our Saviour, the customary representation of which is gathered from the New Testament. It may be Mr. Burne Jones is in possession of a more authentic record, and thus it is that we find the young Saviour floating about in a cave adored by an angel with fifteen heads. The remainder of this remarkable cartoon must be seen to be understood. Angels in a thick wood shading their eyes from a glare which does not exist, and lambs drawn like unto rats. The companion picture was "The Crucifixion," notable for the vast size of the spears and banners, and the incident that the arms of Our Saviour could not physically belong to the same man as the legs belonged to. Many of Mr. William Morris's colours appeared to have been mixed with mud, and he sometimes seemed puzzled to distinguish between naturalesque and conventionalism in his designs for ornament. Mr. J. D. Sedding's designs at the same exhibition showed a want of appreciation of the spaces as well as the ornament; others were laboured, and devoid of appropriateness. As to the work of ladies in the exhibition, it was all, or nearly all, characterised by poverty in invention, weakness in design, and by painful evidence of slavish copyism of the followers and leaders of "capricious fashion." Ladies could do well in the execution of the designs of men in textile art, but they had far better leave the designs to those so much more competent to do the work. Having referred to other exhibits, Mr. Woodward continued. The lessons to be derived by the craftsmen are apparent. He must first acquire a thorough mastery of technical skill in execution, to be obtained in the workshop and on the building, assisted by the theoretical and geometrical knowledge, which he will obtain in the art schools and in the technical colleges. He will labour under the strongest delusion if he thinks that the required skill can be acquired casually without this thorough apprenticeship, and altogether by work in the evening at schools of art or other like institutions. He will see that it is quite time enough to think of design when he has mastered execution. The public will learn that an army of men are engaged in responding to their cravings for more art—they will see that capricious fashion has its adherents in modern artists; they will know the vast sums which are being expended to satisfy the frantic outcry for better design and better work, and they will find that the expenditure will produce scores of professors, dozens of colleges, exhibitions, and art schools, and tons of certificates of extraordinary success in those schools and colleges, but that not ten times the expenditure will produce better workmen, unless some of it is laid aside to insure compulsory and systematic apprenticeship after the old style. Architects will learn that they must co-operate with, and even regulate, to some extent, the work of the painter, the sculptor, and the decorator; but they must leave the absolute designing of the works of those men to those men. Architects are only human, and the strongest and the best of them will find quite enough to do to acquire a thorough mastery over the art, science, and business of the architect. He will not have much time to devote to designs for table-covers and lace curtains. In conclusion, we shall, I know, all agree that whilst every encouragement should be given by the State and by the public to honest art industries, whilst we should extend to every painter, sculptor, and decorator, and to the allied arts our gratitude and our warmest praise for all they have done and are striving to do, we, as architects, looking down from the point of general review and control, which it is our privilege and our pride to occupy, must educate the public to the fact that better work will not be obtained until



## Building Intelligence.

**CITY OF LONDON COURT.**—The new City of London Court was opened by the Lord Mayor on the 6th inst. The building is situated on the south side of Guildhall-buildings and on the west side of Basinghall-street; it will, on the expiration of a short lease, be extended over the site of 84, Basinghall-street, and has been designed with that view. On the ground-floor are arranged the offices for the staff of clerks and bailiffs; on the upper floor, to the west, is placed the judge's court, 45ft. by 26ft., to the east, the registrar's court, 36ft. by 26ft., each with a private room attached, and approached by a separate stair and entrance; in the basement are lavatories, furnace-room, and record-rooms. The building has been designed in the Late Gothic style of architecture, also adopted for the Guildhall Library and the new Council Chamber, so as to harmonise with the Guildhall itself. The external moulded work is in Portland stone with grey granite plinths, the walling is of Kentish ragstone. Internally, the hall and staircase are of Bath stone, the handrail of polished marble, the open roof of oak, ribs springing from four griffins also of oak; the two upper windows are of tinted glass sprinkled with a pattern of roses and crowns. Mr. Andrew Murray is the architect, and Mr. James Morter the general contractor. The edifice was illustrated in the *BUILDING NEWS* for December 16, 1887.

**ELSTOW.**—This place, so well-known as the birth-place of Bunyan, has just had its church restored under the care of Mr. T. G. Jackson, architect, and a handsome clock has been erected by John Smith and Sons, Derby. The clock is fitted with all the latest improvements, all the wheels are of the best gun-metal, with their teeth cut from the solid so as to be perfectly accurate and smooth. The main frame is arranged so that any separate part may be removed without interfering with the remainder, and steel wire ropes carry the weights. Messrs. Smith and Sons guarantee the clock to go with very great accuracy, and so form a standard of time-keeping for the place. The clocks at Wootton and Goldington, near Elstow, were also made by the same firm.

**EXETER.**—Extensive additions have just been made to Mr. Harry Hems's residence at Fair Park, Exeter. The building has been carried up two stories, and the lower portion has been considerably beautified externally, so that now, as a villa, it is one of the most picturesque and handsome homesteads in the neighbourhood. Fair Park is situated near to Mr. Hems's extensive business premises, which he erected in 1881 from the designs of Mr. R. Medley Fulford, of Exeter, and are of red brick, of Flemish type of architecture. The recent additions to Fair Park are also from the plans of Mr. Fulford. They embrace the creation of seven additional bays. The roofs are of steep pitch, with tall stacks of chimneys well conceived in outline, and group pleasantly with the gables. Red brick is used in the structure generally, with red Corsehill stone dressings. The roofs are covered with Broseley tiles, with crestings and ridges of red Maidenhead make. On the north-east angle of the edifice an octagonal turret is corbelled out, surmounted by a vane. On plan it gives the room within a bay window at the corner. All the windows in the old part of the house are also new, and match the additions. The upper part of each window is glazed either with roundels or lead geometrical glazing. A feature to the exterior is the introduction of a permanent iron fire ladder that runs direct from an attic window, and comes close by a window on each story, until it stops on the verandah immediately over one of the ground-floor bay windows. This affords the occupants of any part of the house ready exit should fire occur. The whole of the work connected with these additions has been carried out by Mr. Hems's own staff, under the direction of Mr. Herbert H. Read, his manager, whilst Mr. Jacob E. Harvey acted as clerk of works for the architect. The "house-warming" took place on Tuesday week, that being the twenty-second anniversary of Mr. Hems's first arrival at Exeter, and of finding his celebrated "luckie horse-shoe." On these occasions Mr. Hems has a custom of inviting his entire staff

better system of education for our workmen is adopted, and that better art will remain in the background until they, the public themselves, learn to distinguish with precision the difference between the real artist and the sham professor, the real artist and the sham professor. Now, what are our thoughts, our conclusions as architects, upon the arts and crafts as they present themselves to us in the *practical* sense? I believe that you will agree with me in this—(1) that immense strides have been made, and vast improvement attained in the domestic arts of the country as compared with those of 20 years ago, and that this fact is shown principally in house planning and house decoration, and, if I may term that an *art*, in house sanitation. (2) That during the same period the art of the painter—I am speaking now of easel pictures—has not kept pace with that of the architect. That there has been less invention, less original conception, and more portrait painting—in other words, less devotion to the art as an art, and more to the art as a lucrative profession. (3) That during the same period the art of the sculptor has shown more vigour, and sculptors have, particularly in foreign schools, left to some extent classic reproductions for original designs and subjects, appealing more to the popular taste. We must take care that the nobility and dignity of the sculptor's art is not lost in fanciful and puerile response to vitiated tastes. Sculpture has a grand opportunity at the present moment. Architects will do well to design their houses, even houses of moderate size, with especial reference to the display of sculpture. The expenditure of as many hundreds upon sculpture as there are now thousands spent upon paintings, will add much to the charms and graces of the dwelling—will give to it a refined and dignified character, and will lead many a man to regret that he had not earlier adopted it in place of the daubs, with a name in the corner, which have been represented to him as the masterpieces of masters. (4) That no improvement whatever has, during the same period, been apparent in working the crafts. That the British workman, on the whole—there are, of course, very many exceptions—is as lazy, as pig-headed, as ignorant of the thorough knowledge of his trade, as deficient in common intelligence, in want of accuracy of eye and of hand, and as generally, "cusséd" as he was 20 years before the last 20. That the only hope of substantial and sound improvement is by compulsory apprenticeship, or by some such ordinance as that of the Plumbers' Company in the time of Edward III., which prevented the man working at the trade until he had the assent of the best and most skilled men in the same trade, testifying that he knew how well and lawfully to do his work. (5) That the main duty to secure the required improvement rests with the architect; that as regards much, if not most, of the bad workmanship and bad materials which exist in houses, owe their origin to competition it is true; and, therefore, it behoves the architect to persistently and unremittantly reject all bad materials and workmanship, whatever may arise out of his courage. This would very soon put a stop to bad work, and equally soon to the employment of bad material. No builder would send in the absurd and cutting prices he does if he knew that the architect would insist upon the letter and spirit of the specification being carried out. Thus would the builder be constrained to employ only first-rate men as being cheaper in the end—thus would men have to make themselves first-class before they stood a chance of employment—thus would the demand for the best materials increase in the same proportion—and thus it is, gentlemen, in your own hands in the main to restore the arts and crafts of this country to that grand position worthy of a proud and of a grand nation.

A vote of thanks to Mr. Woodward was proposed by Mr. JOHN LEANING, who did not agree with the lecturer in his condemnation of the British workman. Taking him all round, he found the average workman carried out instructions with great precision and deftness. He often wondered that the workman took so much interest and pleasure in his work. Mr. WALTER CRANE, in seconding the vote of thanks, said Mr. Woodward was a candid critic. He considered it scarcely fair to blame the workman because he was not an artist; he had no opportunity to be one under present con-

ditions. He never got credit for his work, and every inducement was given him to do it as quickly as possible. If an artisan showed any particular gifts, he escaped from his class, and left it at its old dead-level. As to Mr. Woodward's candid remarks on his own work, he thanked him for them, and would only say it was a question of personal likes and dislikes, and no argument would bring Mr. Woodward and himself nearer together. With regard to Mr. Burne Jones's work, it did not matter if a leg were too long or too short. Was there originality in the work itself? Mr. LEWIS F. DAY said he had been disappointed by the lecturer, who was to be pitied if he could not admire the works of such men as William Morris, Burne Jones, and Walter Crane. He was sorry to find that a design for which he himself was responsible, had evoked Mr. Woodward's admiration. The discussion was continued by Messrs. G. C. HAITE, ALFRED HOWARD, F. AUMONIER (who, as an employer of labour, testified to the ability of workmen), MATTHEW WEBB, and FRANCIS HOOPER, the last speaker contrasting the professional and technical training to be gained in Paris and London. At the *Ecole des Beaux Arts*, he pointed out, all students—those preparing to be architects and those intending to become artisans alike—were educated together in the same building, and at the end of the term each student had to submit work done in his own class, and in some other profession or trade which he did not propose to follow; thus the pupils got a general all-round knowledge, which would be serviceable in after-life. Mr. WOODWARD briefly replied on the points raised, and contended that the truest friend of artist and workman was the critic. He held that the British workman was well paid, and in a far better position than the poor draughtsman, and that he did not avail himself of his opportunities for improvement.

### CHIPS.

In consequence of some disquieting reports made with respect to the condition of the foundations of the north-west tower of Llandaff Cathedral, the advice of Mr. Pearson, R.A., has been sought. After making an inspection, Mr. Pearson has expressed the opinion that one of the piers of the tower requires rebuilding. There was no cause for the alarm felt as to the safety of the tower, one of the foundations of which has slightly subsided.

The Countess of Shrewsbury laid last week the foundation stone of the new Eye and Ear Hospital at Hereford. The building will be Queen Anne in style, and will be two stories in height, the facing materials being red brick with Bath-stone dressings. Mr. E. H. Lingen Barker, of Hereford, whose design was selected in competition, and Messrs. Stephens and Bastow, of London and Bristol, are the contractors.

The local authority of Bishop's Castle, Salop, have received three sets of plans and estimates from engineers for the proposed works of water supply for that town. They are by Mr. George Pettee, of Windsor, who estimates the cost at £1,850; Mr. A. J. Gould, of Southampton, £1,875; and Mr. Richard Davies, of Ludlow, £1,896. The plans are being considered by a committee.

The name of Mr. William Owen, architect and surveyor, of Palmeira-square, Warrington, has been placed on the Commission of the Peace for that borough. Mr. Owen is surveyor to the Warrington rural sanitary authority.

A tower and spire have just been added to St. John's Church, Leamington, and the scaffolding will all be removed by Christmas Day. The tower is 8ft. in height, and is surmounted by a broach spire of brickwork, rising to a height of 175ft. from ground to summit of terminal cross. Mr. J. Cundall, who designed the church itself, which is chiefly of brickwork, was the architect, and Mr. G. F. Smith the builder.

We learn that, owing to the steady increase in their business, Messrs. C. Isler and Co., late of 88, Southwark-street, have removed to more extensive premises, and their present address is Artesian Works, Bear-lane, Southwark, S.E. In addition to their various works in different parts of the United Kingdom, Messrs. Isler are fixing artesian bored tube wells at the following places:—J. A. Chadwick, Burton Brewery, Bridge-street, Wrexham; Hooper and Co., Whitfield-street, W.C.; Newton and Co., Old Brewery, Penrith; North Surrey Brewery, Camberwell, S.E.; C. Vause and Sons, Castle-street Brewery, Sunderland; the Wantage Brewery Co., Wantage, Berks; R. White and Sons, Camberwell, S.E.



of assistants to sup with him, and about sixty of these—i.e., the whole of those at present working at Exeter—met on Tuesday week by invitation, and spent a merry evening.

**NANTWICH.**—The Brunner Free Library at Nantwich was opened last week. The building is in the Queen Anne style, faced with Raubon brick and terracotta. The roof is covered with strawberry tiles. The entrance hall leads into the library, reading-room, lavatory, and other offices. The library is 27ft. by 18ft., and 14ft. high to ceiling, and fitted up in pitch-pine and a wood-block floor, and ventilated by a Boyle's ventilator. The reading-room is 30ft. by 31ft., with open roof and stained and varnished timbers, and lighted by a massive lantern light in roof. The cost of the building and fixtures is about £700; the architect is Mr. Thomas Bower, and the contractor Mr. John Matthews.

**ST. NEOT'S, HUNTS.**—A new Congregational Chapel at St. Neot's was opened by Dr. Parker on Tuesday week. The building is Rectilinear Gothic in style, and has a tower 75ft. high to pinnacles, and 90ft. to top of small slated spire. This tower stands in the main street, and is connected with the body of the building by a vestibule 14ft. in length. The chapel measures internally 84ft. 6in. by 34ft. 6in., and has a gallery; the seating is for 450 persons. The roof is carried by open-timbered trusses, and is lined inside with V-jointed boarding. The wall-pieces and gallery timbers are carried by red Corsehill-stone corbels. The seats are the usual open benches, with pitch pine rails and ends. The platform rails, furniture, pulpit, and gallery columns are of oak, and were made and carved by Mr. Harry Hems, of Exeter, from the architect's design. The heating apparatus is on the hot-air principle by Mr. John Grundy. The gas-fittings and front fence ironwork are by Messrs. Starkie Gardner and Co. of the Albert Embankment, S.W. The glazing has been executed by Messrs. Nash and Co., of Clapham. Ventilation is provided for by means of large casement hoppers in the windows, and Robert Boyle and Co.'s inlet air tubes with valves for adjustment as desired, whilst outlet flues are provided at each end of the church. The exterior walls are faced all round by red bricks from Suffolk, Mr. James Brown, of Braintree, having supplied the moulded and decorative red brickwork. The building has been carried out by Mr. George Page, of Buckden, Hunts, whose contract is £3,275. The architect is Mr. Edward J. Paine, of 11, Great James-street, London, W.C.

#### CHIPS.

A new reredos, pulpit, tribune for the clergy, and arched above the existing choir stalls have been dedicated at Dursley, Gloucestershire. The carving has been done by Mr. Sewell (Messrs. Sewell and Bates), of St. Alban's, Herts.

At a meeting of Kilmarnock Town Council, held on Friday, plans for the erection of a bridge over the Irvine and a drive to Bellfield were considered, and that of Mr. Tait, Forth Bridge Works, was adopted, the premium of 10 guineas being awarded to its author. The entire scheme is expected to cost about £2,500.

The City Lands Committee of the City Corporation have agreed unanimously to demolish Newgate Prison and the Central Criminal Court, and to erect upon the site a new Sessions House, suitable to the modern requirements, as well as a row of shops.

Miss Betham Edwards complains in the daily papers that although the East and West Hills at Hastings were recently purchased by the corporation of that town for £25,000, to be preserved as open spaces, the West Hill, just below the ruins of the castle, is being disfigured by deep cuttings for a road, which she declares is quite unneeded. The Mayor of Hastings has replied saying that the disfigurement has been exaggerated, and that the construction of the road is one of the conditions stipulated for by the vendors of the Hills.

A fire occurred on Saturday evening at the extensive saw mills and joinery works of Messrs. Richard Shelton and Co., Wolverhampton. It burned with great fierceness; all the roofs fell in, and the interiors were completely burned out, all the valuable machinery and the finished moulding and joinery being destroyed. The damage is estimated at £10,000, which is partially insured.

The local board of Duddleston have instructed Messrs. Wood and Kenrick, architects, West Bromwich, to prepare plans and estimates for the group of public buildings proposed to be erected on the site of the public hall and adjacent premises.

#### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

#### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII., XLVI., XLIX., L., LI., LII., LIII., and LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—S. and Co.—H. L. B.—A. S. B.—F. R.—D. S. and Co.

BEPRO. (We gave it years ago!)—G. T. (We strongly advise you to have nothing to do with the firm.)—R. T. (Yes, very good indeed; Verity Bros., Leeds.)—J. B. (We should think no one would go elsewhere for such things than to Hayward Bros. and Eckstein's—one associates their name with them as naturally as that of Doulton with Lambeth ware, or Storde with sunburners.)—J. D. (Measures Bros., Rownson, Drew, and Co., or Homan and Rodgers. The people you mention are unreliable.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"Nemesis" should have been included in last week's acknowledgments.

## Correspondence.

#### CLAUSES IN BUILDING CONTRACTS.

To the Editor of the BUILDING NEWS.

SIR,—It often occurs to me how very indifferent to their own interests builders are when subjects which affect them so much are under discussion in your journal, and yet we sometimes read complaints from them that their interests are neglected.

All honour to Mr. Waterhouse, who took such a manly view of the case when denouncing the custom of some architects in sheltering themselves behind the clause "that errors in bills of quantities shall not be considered after the contract is signed."

It is very rarely that errors are found out until the work is too far advanced to retract, because architects who would be guilty of issuing incorrect bills always manage to make their specifications so vague that it is not until they are pressed to explain them that the errors are found out. That is my experience, and no doubt that of many others.

When builders meet with architects (and there are many of them) who, like Mr. Waterhouse, treat them fairly, let them show their appreciation by the very best work they can do, that their clients may see there is nothing lost by employing a liberal and honest archi-

tect. Let builders also rub their eyes a bit, read your journal more regularly than they do, and wake up to what is going on round them, and it will be the better for them.—I am

A VICTIM OF INCORRECT QUANTITIES.

#### DISCONNECTING WATER-CLOSETS.

SIR,—The question of disconnection of each water-closet by separate trapping having been two or three times brought forward in your columns, it may help to a better understanding of the subject, if the pros and cons, as they appear to me, after some observation and experiment, be stated, that those interested in it may judge for themselves whether it has the advantage.

#### PROS.

1. The cutting off by a water trap each closet from the house drain, and other fittings, so diminishing the possibility of communication of poisonous gases and germs.

2. The passage of the air through the soil-pipe, if it is arranged as a downcast with a separate upcast, is quicker, especially during the use of the closet.

3. The necessity of any traps to valve apparatuses is thereby removed, the draught being away from the fitting.

#### CONS.

1. Interference with a free and unobstructed air circulation throughout the whole system, the outside of each closet trap being a *cul de sac* for stagnant foul air, unless another upcast pipe is put, which usually is not done, and would involve some difficulty in many cases.

2. The extra security from the trap is very questionable over the one-trap principle, if the pipes are all arranged properly, and a water seal under pressure is not reliable unless ventilated on the off side.

3. If all foul pipes are downcast, which they should be, with back air pipes and separate upcast pipes having no fitting on them, any gases would be carried in the direction of the current to the upcast pipe, and that without any interruption by the action of fittings, but they would assist it.

4. The whole system being in this way perfectly ventilated—or each section—with one intercepting trap, is not the passage of air throughout its whole length more reliable to prevent gases than the water seal dividing it up in order to keep them out?

5. The increase of pipes and traps to closets (sometimes a large number), with often the difficulty of arranging them, and in an architectural building their unsightly appearance may be raised as an objection.

6. The extra cost, which ordinarily in sanitary matters is a crucial one, would be against it.

7. The loss of flushing power in the drain and in passing the second trap, from the principal fittings, by the break of the extra trap as well as the greater liability of obstruction.

8. The getting rid of traps to valve apparatuses with a down-cast soil-pipe may be just as safely done with or without the extra trap, the current being the same in either case.

Each architect or engineer must determine for himself which he prefers to adopt.—I am, &c.,

ALFRED S. GOODRIDGE, A.R.I.B.A.

Designs have been prepared and forwarded by the last mail by Mr. Herbert J. Jones, M.S.A., of Bristol, for a hospital for men at Hankow, which is intended to be erected for the Wesleyan Medical Mission. The buildings will provide accommodation for 70 patients in five wards, together with the necessary administrative offices. A large hall for mission services forms a part of the arrangements, and the peculiar requirements of the Chinese population, such as an opium ward and coolies' and guests' rooms have been fully considered. It is intended to carry out the work by native labour, and to proceed with it immediately upon the arrival of the drawings and other documents.

The honorary freedom and livery of the Worshipful Company of Turners of London has been conferred upon David Kirkaldy, M.Inst.C.E., and Member of the Institute of Engineers and Shipbuilders in Scotland, "in recognition of his valuable services to metallurgists, turners, and all branches of engineering by his system, machinery, and inventions for testing the strength and other properties of every variety of material used in the constructive arts."



## Intercommunication.

### QUESTIONS.

[9830].—**Gun-Metal and Brass Screw-Down Bib-Valves.**—I have both gun-metal and brass valves specified for a job now in course of erection; but I am sometimes at a loss to know which is gun-metal and which is brass. Can I apply any chemicals which will act on the one and not on the other? A few hints on the above will greatly oblige.—**VALVE.**

[9881].—**Contractor's Law.**—A contractor has signed every page of the specification, which contains certain clauses of the agreement, he has also signed the plans and details, and the agreement has been also stamped and signed as the above. I hear the above is in no way binding on him. Is this the case?—**EXON.**

[9882].—**Chancel at North End.**—Can anyone mention a case in which a church has been erected with the chancel to the north? Also is there any decided objection to the chancel being so placed?—**S. A. M.**

[9883].—**Parian Cement Plastering.**—Will any reader experienced in this subject be good enough to give his opinion as to the cause of dampness under the following circumstances:—The walls of a large room are built hollow, 16in. thick, outer leaf 9in., inner 4½, space 2½; bricks are sound and hard and of excellent quality, acknowledged best in the county; plastering of Parian cement ½in. thick on base of Portland cement and sand ½in. thick. The sand has been tested for salt, which was almost imperceptible, and it was afterwards washed. The position of the building is very much exposed; the work has been done for nine months, and much of it, in this and other similar rooms, is perfectly dry; whilst those portions retaining a damp appearance show clearly the courses of bricks on the surface. I should mention that there is little or no difference in appearance between external and internal walls. The rooms are heated by both hot water and fire, and these agents have been used to assist drying.—**R. S. R.**

[9884].—**Sugar in Mortar.**—I should be glad if any of your readers would kindly say in an early issue of your paper whether they have used sugar in the mixing of mortar during frosty weather, and what amount per gallon. Also, have they found it successful? I am carrying out several important works, and I wish to test its efficacy.—**BUILDER.**

[9885].—**What is a Three-Storeyed House?**—What constitutes (or may be fairly described as) a three-storeyed house? 2nd. In a case where a house is built with ground and first floors, the roof of which is carried up from the ceiling level of the first floor, and an attic formed in the roof by strutting, &c. Is this a two or three-storeyed house?—**C. W. G.**

[9886].—**Hot Water Apparatus.**—Will some kind friend inform me what height the feeding tank of a low-pressure hot-water apparatus ought to be above the coil, and the way to stop the water boiling back in the feeding tank?—**TURO.**

### REPLIES.

[9837].—**What is a Billion?**—It is somewhat amusing to read the replies from "H. H." on p. 731 and "Tried it Before" on p. 765. Both had better try again and they will see that with thirteen figures for a billion—viz., a 1 and twelve ciphers after it (thirteen ciphers are only equal to 0), that gives ten hundred thousand millions for a billion, not "one hundred thousand millions," for one hundred thousand millions only requires twelve figures, say, 100,000,000,000. The 1 and twelve ciphers after it give a billion, as I was taught, which, as another correspondent said on p. 731, is a million of millions.—**W. P. BUCHAN.**

[9838].—**Building Act—Steam Pipes, Low Pressure.**—Please allow me to correct a misprint caused by my careless writing. In your last publication (Dec 7th), on the eighth line from the bottom of my reply to the above it ought to read as follows: When you reach 500lb. (five hundred pounds) to the square inch, the heat is 467° Fahr., or more than the melting point of tin (442°).—**TRIED IT BEFORE.**

[9840].—**Appraiser's License.**—I shall be greatly obliged for a fuller answer to my query in your issue of the 23rd ult., than that given by "H. L." to whom I am, however, much obliged. He appears to assume that appraisements may be made by architects without any liability to license duty; but I have a communication from the Commissioners of Inland Revenue to the effect that "Anyone following the calling or occupation of an appraiser is liable to the license duty, even though the valuation may be made for the information of one party only." What I am desirous to know is how an architect claims exemption?—**DILEMMA.**

[9848].—**Powers of Local Authority.**—"Architect" does not state the number of building on the acre. Assume the estate is to be built on with cottage property, he could put on 24 houses per acre, including back yards and front and back streets. Again, assume the rent of each cottage to be 3s. 6d. per week clear: would produce a rateable value of £6 12s. per house, or £168 8s. per acre, rateable value. Having arrived at this, he should ascertain the amount of rate charged for main sewerage in the district which he desires to drain into. Again, assume the rate to be 1s. in the £1 for 50 years: he will arrive at a fair charge per acre thus—Rateable value per acre = £168 8s. at 1s. in the £1 will produce £7 18s. per acre per year × 50 years = £237 per acre, £237 × 12 acres = £2,844.—**C. C. H.**

[9851].—**Bankruptcy of Contractor.**—The architect should serve a properly worded notice on the trustees of the bankrupt to ascertain by a certain date whether they desire to complete the work, and should they decline the architect can obtain tenders to finish the work. It is possible that the contract contains the usual clause as to bankruptcy.—**H. L.**

[9853].—**Tennis Court.**—The new tennis courts at Knightsbridge, known as Prince's Club, have all their floors laid with Claridge's asphalt. It is a very well-known material. It was introduced in 1838 under the

protection of a patent, and after its expiration special treaties were made for exclusive supplies to the company that works it.—**L. J. P.**

[9854].—**Probationary Drawings at Institute Exam.**—Designs submitted as probationary drawings may be in any style or none, and may be finished in any manner. Ordinary contract drawing for villas that have been carried into execution will suffice so long as both plan and design are suitable to the requirements. Occasionally I have seen most beautiful drawings submitted, but this is not absolutely necessary.—**G. A. T. MIDDLETON.**

[9855].—**Embankments.**—In reply to "No Name," the whole of the information will be found on pp. 228, 229, 230 of Nesbit's "Mensuration."—**C. C. H.**

[9858].—**Building and Adjoining Owner.**—The building owner should obtain consent to execute necessary repairs; but should the work involve interference with the party-wall, notice must be given and the whole matter carried out in accordance with the Metropolitan Building Act, 1855, Part III. sections 82, &c.—**H. L.**

[9859].—**Levels.**—There are no better levels than those sold by Stanley, of the dumpy pattern, and personally I prefer those with four levelling screws to those which have only three. Good instruments are occasionally to be obtained second hand, but none should be purchased under such conditions without trial in the field.—**G. A. T. MIDDLETON.**

### PARLIAMENTARY NOTES.

**WESTMINSTER HALL.**—Sir G. Campbell asked the First Commissioner of Works on Tuesday what was to be done with the space between Westminster Hall and the road, formerly occupied by the Law Courts, when the repairs of the Hall were finished; whether that space would be reserved for use in case, in consequence of change of procedure or otherwise, it became necessary to add new chambers to the Houses of Parliament; what use was to be made of Westminster Hall when repaired; and whether he would reserve the Hall to be the central hall of Parliament in case chambers for portions of the House were erected on the outer side. Mr. Plunket: The plans for the restoration of Westminster Hall, which were approved by the Select Committee of 1885, and which are now being carried out, did not include any proposals for dealing with the space between the new buildings and the roadway; but I have been for some time in communication with Mr. Pearson, and we hope soon to arrive at a definite conclusion on the subject. Westminster Hall will remain, after the restorations have been completed, as it was before it was commenced. I have never heard of any project for adding new chambers for portions of the House, such as is suggested by the question. Mr. Shaw-Lefevre: Is there any intention to erect new buildings. Mr. Plunket: None whatever.

### CHIPS.

The foundation stone of the new Town Hall at Sutton-in-Ashfield, Notts, was laid by his Grace the Duke of Portland, on Monday, the 10th inst. The building is Classic in design, and contains shops and a covered market on the ground floor, and a large hall, 90ft. by 45ft., and two ante-rooms on the first floor. The architect is Mr. J. P. Adlington, of Sutton-in-Ashfield, and the contractor is Mr. F. Price, of Sherwood Rise, Nottingham.

Considerable alterations are being carried out at the National Bank buildings in College-green, Dublin, from plans by Mr. C. Geoghegan. The low side wings are being carried up to the height of the central elevation, which will be surmounted by an allegorical group in Portland stone representing Erin, accompanied by wolf-dogs, and bearing the harp of Ireland. Mr. R. Toole, of Dublin, is the builder.

Messrs. J. and A. Leslie and Reid, engineers, Edinburgh, have been instructed to report to the Dunfermline Town Council as to the best means of increasing the water pressure in the burgh, and as to what steps should be taken with the view of preventing vegetable matter getting into the pipes.

An assembly-room is about to be added to the Municipal Buildings at Tamworth, from designs by Mr. N. Joyce, of Stafford.

Rathy Church, near Leicester, has just been reopened after considerable alterations and improvements in the interior. Amongst others may be mentioned a handsome brass eagle lectern, which, with chancel standards and other articles, was intrusted to Messrs. Jones and Willis, of Birmingham and London.

A new police-station has been erected at West India Dock-road, and special attention has been paid to the ventilation, which is carried out on the Boyle system, the latest improved form of the self-acting air-pump ventilator being adopted for the extraction of the vitiated air.

The London-street Board School, Edinburgh, is warmed and ventilated throughout by means of Shorland's patent Manchester grates, supplied by Mr. E. H. Shorland, of Manchester and London.

### LEGAL INTELLIGENCE.

**A BUILDER'S CLAIM FOR PLANS AND MATERIALS.**—In the Outer House of the Scotch Court of Session on Friday, Lord Fraser gave judgment in the case of "Alexander Stewart v. James Newsome." The pursuer, who is a builder and joiner in Dundee, sued the defendant, a circus-proprietor, residing in Birmingham, for payment of £1,718 12s. 8d. as the balance due on account for £4,718 12s. 8d., incurred in preparing plans for, and building and furnishing, a circus in Nicholson-street, Edinburgh. The defender explained that the original contract price was £2,200, but that this sum was increased to £4,700. He did not admit that any extra work had been executed by the pursuer, and averred that, even if such had been performed, it was amply covered by the sums paid. His Lordship, in giving judgment, held that the contract alluded to by the defender only applied to the first of two sets of plans. £3,000 had been paid by the pursuer, £1,718 12s. 8d. was the sum now sued for, bringing out a total of £4,718 12s. 8d. If the defender paid that sum he would get value for his money, for the circus had been let by him on a three years' lease at £1,300 a year, which was certainly a very excellent return. The building being fireproof, he would get it insured at a reasonable rate. Decree in favour of pursuer, with expenses, was pronounced.

### STAINED GLASS.

**CRUMPSALL.**—The east window of St. Mary's Church, which has been filled with stained glass in memory of the late Bishop Fraser, was unveiled on Saturday afternoon. The window is the work of Messrs. Hardmans, of Birmingham, and its cost is about £720. Bishop Fraser for some years held his ordination examinations in St. Mary's Schools, and used St. Mary's Church as his chapel. The old church was struck by lightning in 1872 and completely destroyed, except the tower, spire, and south porch. The church was then restored at a cost of more than £17,000, in accordance with plans prepared by Mr. J. S. Crowther. In the upper part of the memorial window is a representation of our Lord surrounded by angels. Below the five lights are filled with pictures to illustrate the life of St. Mary as told in the Gospels. In the centre light is the Crucifixion. The others are occupied by pictures of the Annunciation, the Presentation, the House at Nazareth, and the First Miracle. Underneath are representations of the Adoration of the Magi and of the Shepherds, the Virgin and Child occupying a position in the centre of this part of the window.

**EDINBURGH.**—The stained-glass window forming part of the Montrose Memorial in St. Giles's Cathedral has now been completed. It is entirely heraldic in design, and contains upwards of thirty coats-of-arms representative of relatives and companions in arms of the great marquis. The heraldry is arranged with regard to variety and artistic effect rather than in any order of precedence. The rich and brilliant colourings of the blazonries are set upon a ground-work of light glass, and by the several arms being alternately placed singly between those ranged in pairs a pleasing diversity is introduced. This distinctive bearings, with crests, mantling, &c., bear evidence of studied adherence in details to the art of Montrose's time. The window corresponds in the style with the new monument alongside. The committee who have had the charge of the erection of the memorial have, in arranging the window, had the benefit of the advice of Sir Noel Paton, Mr. Burnett, Lyon King of Arms, and Mr. George Seton. The whole work has been carried out by Messrs. James Ballantyne and Son, Edinburgh. The monument itself, designed by Mr. Rowand Anderson, and executed by Messrs. Rhind, was illustrated in the BUILDING NEWS for the 26th October last.

**BRECHIN.**—The west window of St. Andrew's Church, Brechin, has been filled with stained glass, by way of memorial to the late Earl and Countess of Dalhousie. The chief subject, which occupies the whole of the upper portion of the three principal openings, is Christ's Sermon on the Mount. Below this, in the lower part of the window, three other pictures assist to tell the story, and to illustrate the Divine exhortation. The work is from the studio of Messrs. Powell Brothers, of Park-square, Leeds, whose design was selected in open competition with other artists.

The Public Libraries Act having been adopted by the urban authority at Sittingbourne, who have had a library of books presented to them, numbering about 4,000 volumes, a free library and reading-room was opened on Monday. The library is situated in the centre of the town.

Sir Frederic Leighton's "Captive Andromache," at present in the Liverpool Autumn Exhibition, has become the property of the corporation of that city. The picture is priced in the catalogue at £6,000.



## Our Office Table.

THE associates of the Royal Scottish Academy presented a memorial to that body some time ago suggesting certain reforms in their constitution, including the removal of the limitation to the number of associates, conferring a vote on associates, and permitting them to teach in and visit the schools of the Academy, and giving effect to the existing rule providing for the establishment of a school for the study of the antique. They have just received a reply stating that "the Academy is at present engaged in the consideration of the steps necessary to forming a new charter, and of the alterations in the terms of the present charter, which it is desirable to embody in it." They are further informed that their suggestions will be carefully considered.

A SCHEME has been drawn up for the establishment of a Liverpool Trades Technical School, of which Mr. G. Howell, M.P., is nominated as president, and Mr. Henry Summers, architect, Liverpool, as principal, with qualified assistants in drawing, construction, quantity surveying, land surveying, &c. The provisional committee is composed almost entirely of practical artisans, and it is proposed that the governing council shall be nominated by the various trades of the city. This is the first practical attempt that has been made in Liverpool to establish a technical school directly appealing to the sympathy and support of the trades themselves. Negotiations are in progress for the acquirement of premises in a central situation, and having ample accommodation for the purposes in view. The subjects taught will include practical architecture, masonry, brickwork (gauged and ornamental), carpentry, joinery, plumbing, ironwork, plastering, ornamental painting, and ornamental glazing. In addition to evening classes and lectures, the school is to be open during the daytime to give those able to attend an opportunity of preparing for examinations and executing models and specimens for exhibition. The school has been placed under the regulations of the Government Science and Art Department and the City and Guilds of London Institute.

It is proposed to create yet another seaside resort, the subject for operations being the sleepy little town of Pwllheli, on the Carnarvonshire coast. Pwllheli possesses a sandy beach and a background of mountains, the drawbacks being the slow and bad railway communication and the difficulty of access from the town to the shore. A syndicate has acquired possession of the beach, which has been laid out as an esplanade, the scheme embracing the construction of a pier and winter gardens. Mr. R. G. Thomas, of Menai Bridge, is intrusted with the general details of the work, which include the construction of a seawall and an esplanade some 300 yards in length, Mr. Owen Roberts being the architect of the houses; and for the new hotel, which is to stand at the corner of the new terraces, the contract has been let to Messrs. John Jones and Co. The corner-stone of the terrace was laid by the Mayor of Pwllheli on Friday amid much speech-making.

A LARGE travelling crane, worked by the electric current, has been introduced into the timber-yard of Mr. Herrmann, at Limehouse. It has been designed by Messrs. R. E. Crompton and Co., of Chelmsford. Electricity has been adopted to avoid the insurance rates required for steam-cranes, which are obviously dangerous in a wood-yard. Hydraulic power might have been used for the crane, but there was already an electric plant for lighting purposes on the premises, and hence electricity was adopted. The new crane runs on a tramway along the roof of the timber warehouse, and is used to raise the incoming logs of timber from the canal. An electric motor is attached to the frame of the crane, and geared with Raworth friction gearing to a central shaft, which, by means of three levers and a foot-brake, hoists, slews, and propels the crane. The current is conveyed to the electric motor by two copper tubes, laid along the tramway, and taken off suitable contacts. In other respects the crane is of the ordinary build.

A NEW system of sewage disposal, invented and patented by Mr. W. H. Hartland, was

described by Mr. W. Kaye Parry at the annual meeting of the Institution of Civil Engineers of Ireland last week. The process consists in passing the sewage through a siphon into a settling tank, and afterwards filtering it through vertical layers of broken limestone or chalk, and subsequently breaking it up into fine spray in an aeration chamber; second settling and filtration through shale and peat processes forming the final stage in the treatment. Experiments on a considerable scale have been made at Kingstown, near Dublin, with satisfactory results, in Mr. Parry's opinion, there being an entire absence of after-putrefaction of the effluent, and the sludge recovered has, it is believed, a definite commercial value. As no chemicals are employed, the working expenses are small.

A MEETING of the Registration Committee of the District Council of the Plumbers' Company for West Lancashire, Cheshire, and North Wales was held on Monday at the Free Library, William Brown-street, Liverpool. Dr. Stopford Taylor (medical officer of health for the city) took the chair. The chief business was the consideration of the applications of master and operative plumbers for admission to the register of qualified plumbers. Twenty-three applications were favourably considered, and these names will now be sent to the Worshipful Company of Plumbers as being men who have given satisfactory evidence of their qualifications.

MESSRS. FRANCIS MORTON AND Co. (Limited), of Liverpool, rank amongst the oldest established firms in the country engaged in the manufacture of iron roofs, buildings, and constructional wrought and cast ironwork. The gradual extension of their business having necessitated constant enlargement of premises, they have been compelled to add to their Liverpool establishment extensive works situated on the Mersey, at Garston, a suburb of Liverpool. These works, which cover more than ten acres, comprise an extensive range of lofty, well-lighted buildings, with private dock and railway siding accommodation. The north side of the inclosure is occupied by a shop 600ft. long by 120ft. wide, for girder, bridge, and roof-building purposes. On the opposite or south side is a series of shops fitted with plant for various classes of work, comprising the foundry, dressing shop, brass foundry, fitting and turning shop, smiths' forge, sawmill and painters' shop, two large establishments filled with special machinery and appliances for the manufacture and storage of patent iron telegraph-poles, corrugating machinery shop, and packing shop. Close by is a separate building, 100ft. by 90ft., devoted to galvanising, containing the complete plant for turning out over 200 tons of galvanised sheets per week. On the east side are found the general stores and stabling. The west side has a frontage of about 500ft. to the Mersey, being entered from that river by a private dock, which runs up into the open yard, and provides accommodation for vessels up to 270ft. in length.

A LARGE number of people interested in the Cape and shipping trade recently assembled on board the Castle Line steamer *Roslin Castle* (4,349 tons) to inspect the alterations and improvements made in that vessel. She has recently been fitted with new boilers and triple expansion engines by Messrs. Richardson and Co., of West Hartlepool, and a new stem has been built on to her, giving an additional length of about 15ft. The *Roslin Castle* has been fitted with a complete installation of the electric light, and with pneumatic bells and hot and cold baths. The new decorations have been carried out under the superintendence of Mr. G. Duncan, of Effingham-street, Belgravia. The prevailing tone of the colouring in the principal saloon is a soft bluish-grey, intermixed with vellum tints and relieved with gold, harmonising with the rich satin-wood panelling. The iron girders which support the ceiling and upper deck have been treated with gold and the above-mentioned colours. Portraits of well-known men, including Milton, Hogarth, Wren, and Beethoven, painted by an everlasting process on raw sycamore wood, have been introduced round the lining of the skylight. The ladies' boudoir is upholstered with green brocatelle, and is panelled with cedar and sycamore. The new ceiling in the principal smoking-room, with

its octagonal panels, is rich in colour. The walls of the ventilating shaft are of a bluish grey, stencilled with a rich design in a similar, though lighter, colour in imitation of flowered silk. All the state-rooms have been enamelled and decorated.

### MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. 8 p.m., Society of Arts. "Light and Colour," Cantor Lecture No. 4, by Capt. W. de W. Abney, C.B., F.R.S. 8 p.m.  
TUESDAY.—Institution of Civil Engineers. "The Friction of Locomotive Slide Valves," by J. A. F. Aspinall. 8 p.m.  
Manchester Architectural Association. "Hoses Cold-Water Supply Fittings," by J. Corbett.  
Birmingham Architectural Association. "Pompeian Art," by Whitworth Wallis.  
Glasgow Architectural Association. "Joinery," by R. C. Grant.  
WEDNESDAY.—Society of Arts. "Standards of Light," by W. J. Diddin. 8 p.m.  
THURSDAY.—Sanitary Institute. "The New Local Government Bill and the County Councils," by Ernest Hart. 5 p.m.  
Edinburgh Architectural Association. Annual dinner.

### CHIPS.

By the fire which broke out at Messrs. Doulton's potteries, in High-street, Lambeth, on Tuesday night, damage to the extent of over £15,000 was occasioned. The building destroyed was the general factory, which included the glazing department, and immediately underneath it were five kilns, the engineers' workshops, and the cellar, where the clay for the entire works is manufactured. The new engine-house was also greatly damaged; but the fine-ware building adjoining was saved, as the men had the presence of mind to close the iron doors when the alarm was given.

A new bakery in Hardman-street, Liverpool, was opened on Friday. It occupies the site of an old homoeopathic dispensary, and is three stories in height, and is built of cement concrete and ironwork, faced with glazed bricks and tiles. The contractors for the building were Messrs. Tyson and Williams, of Heath-street; the wall tiling and marble work has been executed by Messrs. Stubbs and Son; the whole being carried out from the designs and under the superintendence of Mr. Henry Hartley, architect, of Harrington-street, Liverpool.

In the Nisi Prius Court, before Mr. Justice Grantham, at the Liverpool Assizes, on Saturday, John Fisher, a master builder, living near St. Helen's, sued Robert Jackson, timber merchant, of Rainhill, for damages for the seduction of his daughter, Elizabeth Fisher. After three hours' consideration, the jury disagreed and were discharged.

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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1772.

FRIDAY, DECEMBER 21, 1888.

## CITY PLANNING AND STREET ALIGNMENT.

"THEY do these things better in Paris" is a current phrase, which is undoubtedly true of the administration of building law in the French capital. The provisions for defining lines of frontage, heights of buildings, and other matters in the Metropolitan Building Acts are anything but efficiently administered. Our metropolitan readers know that a short Bill has been prepared and brought before Parliament to limit the height of buildings—a matter affecting the health and habitability of the metropolis. The subject of the building regulations in Paris has been lately discussed at the Institute, and many of our readers are aware of the Civil Code and Alignment Act there in force, the administration of which is in the hands of a body of officials who are beyond the dicta of vestries and individuals. We have often maintained the need of a revision of our Metropolitan Acts which will make them more in accord with the rules and regulations of buildings both of France and Germany. The effect of the Alignment Act in France is that those buildings which are in advance of the general line are allowed to remain only on sufferance—that is, their existence is tolerated only so long as they remain in a structural state of soundness. No structural repairs to foundations or walls are allowed which would prolong their term of existence. In short, the effect of this law is to discourage the continuance of buildings that encroach beyond the general line laid down by the authorities or the Prefect of the Department. In London and the provincial towns of England we have practical evidence before us of the operation of the Building Acts and By-laws. Instead of discouraging the existence of buildings that are in advance of a line of frontage, builders of new houses can, by taking advantage of the optional powers vested in the authorities, actually come out beyond the long-existing frontage of the street, as they have done lately in the glaring private encroachments commenced in the Marylebone-road and Euston-road, referred to the other day by Mr. William Woodward in his timely remarks at the Institute. Street alignment, we take it, is one of the most essential conditions of the health and architectural dignity of every town in the future. We can, of course, enjoy the piquant diversity and want of order in the old cities and villages. Unfortunately, this phase of municipal life is past—we say "unfortunately" from the poet and painter's point of view—and we have lost all that is picturesque in our towns. We have now entered upon another phase of town existence, due to the rapid increase of the value of land, and it is owing to these altered circumstances that building laws have become necessary. If we crowd our large populations into smaller limits of area, it is compulsory on the part of the authorities to leave as much open space in our streets and in the rear of our houses as possible. Alignment of our streets follows as a matter of course. Somewhere the line must be drawn. We do not say that the lines should be straight, or that the streets should be built with the chess-board precision of American cities; but it is obvious that, as towns increase, the thorough-roads should grow with them, or, at any rate, that they should be planned with relation to their future requirements and the demands of traffic on them. We all know how the

immense size of London has outgrown its thoroughfares. Cheapside, the Strand, and Fleet-street are congested to a dangerous degree, and the state of traffic begins to tax the resources of the police.

The ill-working of the Metropolitan Acts arises from the present constitution of the governing bodies—a state of things that will be soon changed. The vestries are now local authorities merely in name: they have long been under the vetoing power of the Central Board. So that, in fact, although there is an Act of George II. which favoured the setting back of houses, and more recent legislation, such as the 25 and 26 Vict. cap. 102, sect. 75, there has always been a possibility of evading the intention of the framers of the Act, of obtaining the consent of a few members, or of disregarding the action of a local vestry, upon any question of frontage. In Paris public improvements are left to specialists to deal with: the case is different here, where the ratepayers have a voice, or seek to obtain one, through their appointed representatives. Architecture, too, holds a place in the public improvements of the French capital; plans of street improvements are exhibited to the public. Here architecture counts for little; the consequence of which is that architects are a power across the Channel, and have a voice in public works, while here they have none. The acquirement of land for public improvements is in London controlled so much by the rights of individuals—rights of light and support are such powerful factors in the hands of dominant owners—that we cannot at present hope to obtain any redress by pointing to the laws of our neighbours, to whom prescriptive rights are scarcely known, while the contrast between the French and English administration of building legislation is as great as the contrast between the machinery of the Metropolitan Board of Works, and that of the Prefecture of the Seine.

Not the least important of the laws required for the control of buildings has reference to the height to which new structures may be carried. The question primarily affects lighting. Happily, on large leasehold estates, the prescriptive right of light which is so vexatious a hindrance to building in new thoroughfares, does not interfere; the landowner has a voice in deciding upon such matters as height of elevation and windows overlooking adjoining properties. The value of the restrictive covenant is great if framed carefully; but the power of ground landlords is now on the wane, and if leasehold enfranchisement is to take the place of the present system, building will have to be governed entirely by legislation, or we shall see the individual setting aside all order, and ignoring entirely the rights of his neighbour.

The economical problem of providing for an increase of floor area has been apparently solved in the City of New York, where buildings of 150ft. high and more are erected and found to let. In London the question is whether a market can be obtained for floors high up in the air. Even fourth floors are not found to let well in the City, despite their freedom from ground mists and the better lighting they get. The professional and business man still hesitate to take a floor requiring the ascent of four flights of stairs. The "elevator" or lift has not yet been brought into requisition in buildings let as private chambers, though for factories and hotels they have proved a boon. It would scarcely pay to provide a lift to the fourth floor of a house for the use of the tenants, as the lower floor tenants could hardly be called upon to bear their share of the working expenses. In the great cities of the West, the tall tenement house is almost indigenous to the soil, the services of hydraulic power are laid and at hand, and there is little more expense than to "lay on" the necessary

pipings, or to put up the mechanical elevator. A long time will probably elapse before anything of this sort is done in London. The rights of adjoining owners have to be respected, and English business men are not so fond of tall houses as to prefer such altitudes. Besides, we cannot compare the two cities. London is not built on a narrow island limited in breadth, like New York, and is therefore not compelled to make up in height of building for restricted area. Yet, notwithstanding the prejudices of City men in London, we have the fact staring us in the face that ground-rents are beginning to be enormous, are going up every year, and floor area is proportionately limited. To make additional room, the old buildings, as fast as they come down, are rebuilt of greater height. To take the City alone, it is not an exaggeration to say that the floor area within the City has been doubled in this manner within the last 30 years, and there is a strong tendency to increase the number of stories. Any new building legislation will have to provide for or against this alternative; it must either provide additional width of street for every foot added to a certain number of stories, and, further, to require a large area of ground to be taken; or a certain limit of height should be insisted on. If every leaseholder had the power of doubling the height of his house, the Metropolis would be rendered perfectly uninhabitable in a few years—in fact, would acquire the suicide-impelling aspect of Victoria-street, Westminster. If one who desired to add an additional story beyond a certain height were made to set back and to widen his frontage, the mania for tall buildings would soon cease. In Paris the height is governed mainly by the width of the street, and no more scientific or safer rule can be devised.

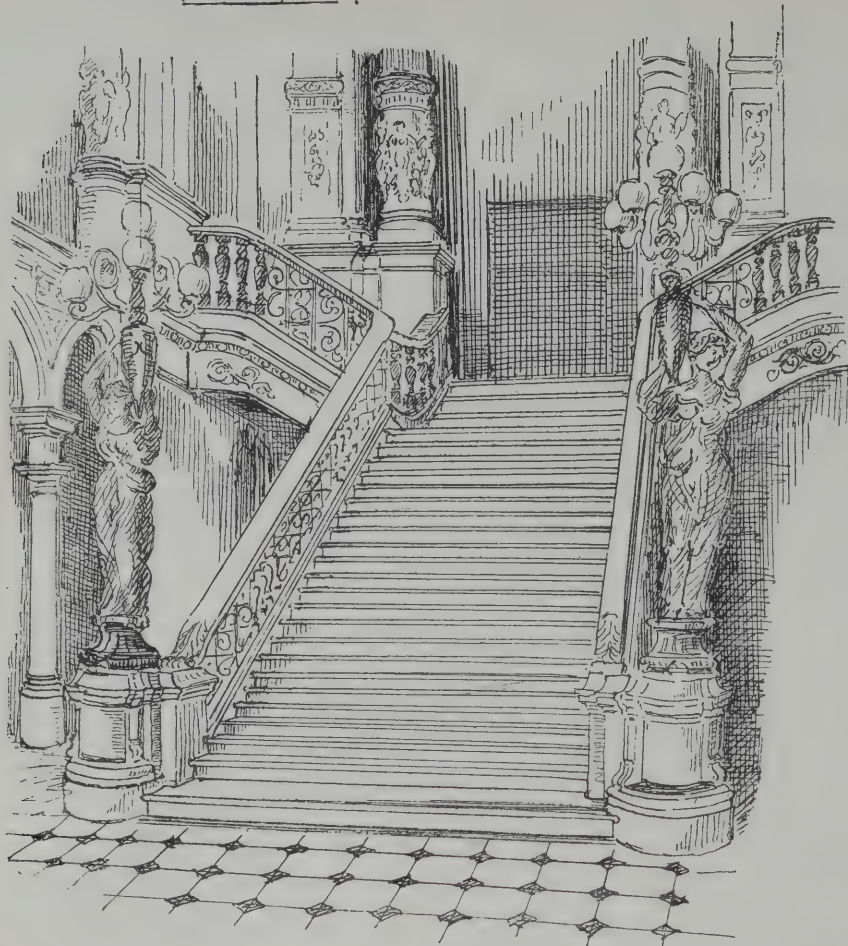
## HALLS AND STAIRCASES.—XII.

PASSING to the consideration of other forms of staircase design, we may notice some of the possibilities of planning. Square halls we have dealt with; the one-side flight, the bi-lateral, the central and wing arrangements have been noticed. Another form of staircase hall, that of the octagon, is less common, and we may add less satisfactory. In the case of an octagonal hall the flights can be arranged in like manner to those of the square. There may be an ascending flight on each side commencing at the square or oblique sides, uniting with a central flight to the landing; or there may be a commencing centre flight branching or bifurcating into the wing flights. If there are quarter-paces at the angles of the octagon, they would form irregular lozenge-shaped spaces, by drawing the last and initial risers of two consecutive flights at right angles with the sides of octagon. An architectural treatment might be given by carrying the inner end of steps on ramped arches, another tier of arches springing from the balustrading—thus forming a kind of inner screen or open newel. The octagon hall could be roofed by timber with radial principals supporting a lantern, or be vaulted above. The circular is another form of staircase which has been largely employed by architects, from the small circular belfry stair turret to the open-pillared newel of the Campanile to S. Nicola by N. Pisano. Our limits do not allow of our entering at any length into this variety, which is chiefly employed when space is limited. The winding staircase has played an important part in architecture, and many beautiful examples are to be met with in France in which both the solid and open newel are to be seen. At the Château de Chambord, Blois, there is a noted instance of two separate winding staircases, 30ft. in diameter, with a 10ft. newel.

We have noticed the beautiful instance of Châteaudun, and in this country we have the



Sketch 25.



GRAND STAIRCASE, FEDERAL COFFEE PALACE

MELBOURNE

circular or polygonal staircases, with pierced newels, for witnesses in the Royal Courts of Justice, and of the Manchester Town Hall, as instances worth mention. There is less variety in design, however, possible with the winding stair, except, indeed, in the treatment of the newel and in the piercing of the outer walls, which one sees carried to perfection at Blois, Hotel de Cluny, St. Gilles, Fontainebleau, and other places. In picturesque arrangements no country is so wealthy as France. In some of the court staircases

tween, is capable of being made a very dignified arrangement. Plan 26 gives the scheme in a design for the Edinburgh Municipal Buildings; the two stairs are divided by a hall space, each is lighted from an open court-yard, and the main corridors run on both sides of these areas. For a confined space the double arrangement is effective; wide flights of stairs are not necessary, as each staircase can be limited in dimensions.

Plan 27 shows an open-galleried central

Plan 26.

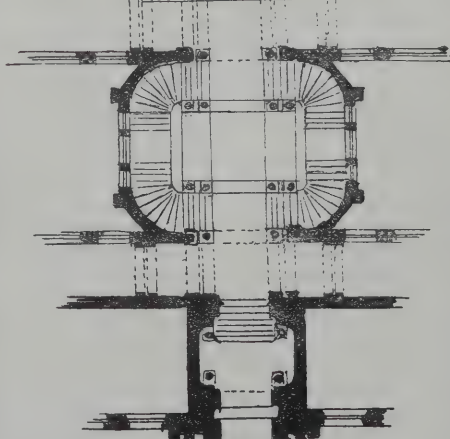
NOTTINGHAM MUNICIPAL OFFICE



at Rouen considerable ingenuity and quaintness are met with in the half-timbered houses in the massive balusters and handrails, and in the manner the first steps are brought out circular and finished.

Variety and accommodation are qualities that are more likely to be obtained by a departure from the ordinary types. A division of the stairs into two parts, with a hall be-

Plan 27



hall, with lateral flights, designed for the Nottingham Municipal Buildings—a good arrangement, affording a large open area opposite the pay office, the main corridors running right and left from the hall. On the first floor a landing or gallery surrounds

the hall, which is top-lighted. Our sketch represents the grand staircase of the Federal Coffee Palace at Melbourne. The main flight is skilfully managed and terminated by massive stone newels. In the Natural History Museum at South Kensington we have an example of a large central open-galleried hall, having at the end facing the entrance a staircase of the wing-type. A dignified effect is the result. The details and balustrades are executed in terracotta; they consist of an arcade of ramped arches on pillarettes, which is diversified by the openings being broken by a centre line of pillarettes carrying lintels, which come down to a level with the springing of the outer arches. The wing flights are carried on walls pierced by arches. The staircase forms an essential part of the hall architecturally; the architect has made the structural lines of hall agree with the stairs, the ornamentation is characteristic, and the material of the hall—terracotta—is carried throughout the staircase and its details.

## STRAINS.—X.\*

By G. A. T. MIDDLETON.

FRAMED BEAMS AND GIRDERS.

THE strains on all framed structures can be ascertained mathematically by solving triangles, parallelograms, and polygons of forces; but as all these, round all the joints in a structure, can be included in one diagram of the kind used in the last chapter, and as such a diagram requires only accurate draughtsmanship for its solution in the place of a considerable acquaintance with mathematics, it is now almost universally employed; although on structures of magnitude and importance it is best to calculate the strains by both methods, that the one may check the other. In this work, however, the diagram will be adhered to, for anyone following it and possessed of the mathematical knowledge to enable him to check it by figures would at once grasp the method of doing so.

The simplest example of a framed beam is the trussed traveller (see Fig. 67). The greatest

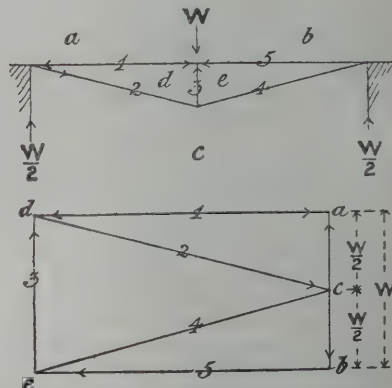


Fig. 67.

strains in the members are found when the weight which it has to carry is over its centre; for if the weight be in any other position, a portion of it only would be carried by the strut in the centre (as an abutment), the remainder being carried direct by one of the main supports. With the weight in the centre, the reaction of each support will equal  $\frac{W}{2}$ . Letter

the spaces as shown in Fig. 57, taking the spaces outside the structure first, and then those inside, in rotation as the sun moves. The space between the reaction of the left-hand abutment and W is thus known as a, that between W and the other reaction as b, that between the two reactions as c, that between the members 1, 2, and 3 as d, and that between the members 3, 4, and 5 as e.

Between the spaces a and b there lies the

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load  $W$  acting vertically downwards. Set to a scale of weights at the side a line vertically downwards from a point  $a$  to a point  $b$  to represent  $W$ . Between the spaces  $b$  and  $c$   $\frac{W}{2}$  acts vertically upwards. Set up vertically from  $b$  to  $c$  a distance to represent  $\frac{W}{2}$ ; similarly set up from  $c$  to  $a$  a distance to represent  $\frac{W}{2}$  acting upwards between the spaces  $c$  and  $a$ . The line  $abca$  on the diagram now forms a closed polygon, which represents the forces  $W, \frac{W}{2}$  and  $\frac{W}{2}$  acting externally upon the structure, and which are themselves in equilibrium.

In order to ascertain the strains in the members it is necessary to form on the diagram polygons of the forces which act at each of the joints in succession, and it is usual to commence with the joint over the left hand abutment. Here, besides the reaction  $\frac{W}{2}$  upwards between  $c$  and  $a$ , there act the strains in the members 1 and 2. As the line 1 lies between the spaces  $a$  and  $d$ , draw a line parallel to it on the diagram from  $a$  till it is cut by another from  $c$  drawn parallel to the line 2, which lies between  $c$  and  $d$ , these new lines on the diagram meeting at the point  $d$ . Then  $ad$  on the diagram represents to scale the strain in the member lying between the spaces  $a$  and  $d$ , and  $cd$  represents the strain in the member lying between  $c$  and  $d$ ; the lines  $\frac{W}{2}$ , 1, and 2 forming a close polygon in the diagram.  $\frac{W}{2}$  is known to act upwards, and the other forces, following in rotation, necessarily

joining  $cd$  on the diagram, and if the working has been correct  $cd$  should be parallel to the line 4 (which lies between the spaces  $c$  and  $e$ ) on the sketch. The direction in which it acts can be found by following the arrows round either of the polygons of forces of which  $cd$  forms a part—viz., either of those representing the forces acting at one of the extremities of the

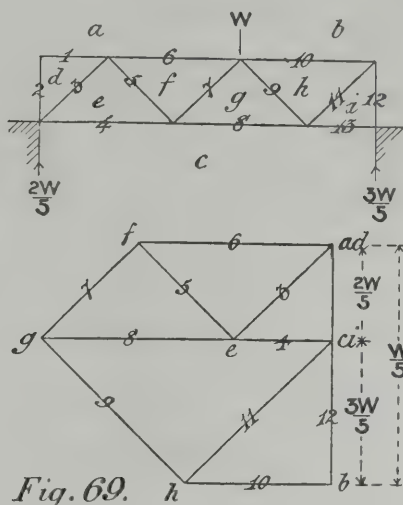


Fig. 69.

line 4. These arrows have not been shown, to avoid confusion, 4 being in tension.

A larger trussed traveller, with two struts and cross braces is shown in Fig. 68. The greatest strains in the members are evidently produced when the weight is directly over one of the struts; but it must be carefully borne in mind in designing such a structure that the weight, which is a travelling weight, will sometimes be over one, and sometimes over the other, while the members 1, 5, and 11 must be made sufficiently strong to carry it as a central load.

The solution is very similar to that of the previous example until the joint under the load is reached, save that the reactions are not equal. So far the strains in the members 1 and 2 will have been found; but at the joint under the load, the forces which act are five in number—viz., the load  $W$ , and the strains in the members 5, 4, 3, and 1. Of these, three are

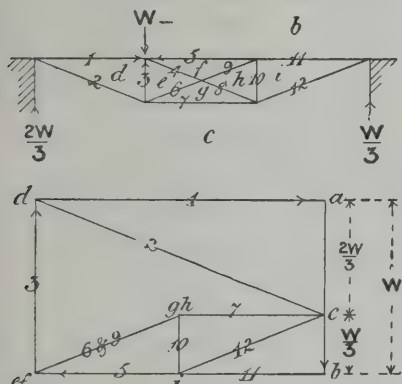


Fig. 68.

act as shown by the arrows from  $a$  to  $d$  and from  $d$  to  $c$ . These arrows, on being transferred to the sketch, show 1 pushing towards and 2 pulling from the joint—in other words, 1 is in compression and 2 in tension.

Hitherto three forces only have acted on any one point; but directly under the load four forces will be found—viz.,  $W$  and the strains 1, 3, and 5. The values of two of these only are unknown, and can be found; their directions being known, and it being therefore possible to close the polygon about the joint by drawing  $de$  on the diagram parallel to the line 3 lying between  $d$  and  $e$  on the sketch, and meeting it by  $be$  drawn parallel to the line 5 lying between  $b$  and  $e$  on the sketch. The line 1 is known to be in compression, and therefore acts towards this joint just as it was shown to do towards the joint at its other extremity, and its direction may therefore be represented by an arrow from  $d$  to  $a$  on the diagram.  $W$  acts downwards from  $a$  to  $b$ , maintaining the rotation, which is kept up by 5 acting from  $b$  to  $e$ , and 3 acting from  $e$  to  $d$ . This closes the polygon 1,  $W$ , 5, and 3 on the diagram representing the strains on 1,  $W$ , 5, and 3 respectively in the sketch, and the direction arrows, when transferred, show that 5 and 3 are both in compression, acting towards the joint. It will be noticed that the strain in 3, which is directly under, and has its line of action coincident with that of the load, is equal to  $W$ . The strain in 4 can be ascertained by

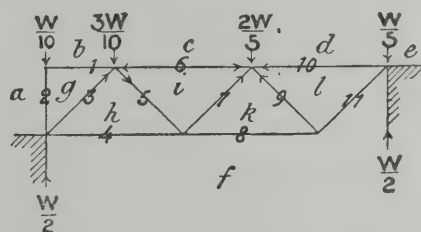


Fig. 70.

unknown, so that without an assumption the polygon cannot be completed, nor can the strains in these members be determined. By calling in the assistance of common sense, however, in this as in most cases an assumption is rendered possible which will permit of the required solution being arrived at. Bearing in mind what occurred during the solution of the previous example, we may fairly assume here

the member 3, being directly under and coincident in direction with the weight, is placed in compression to the extent of that weight. Set down on the diagram, therefore, a vertical line  $de$  to represent the strain in the member 3, lying between the spaces  $d$  and  $e$ , equal in value to  $W$ . The member 1 being in compression acts towards the joint, this being represented by the arrow from  $d$  to  $a$  on the diagram. The member 3 we know to be also in compression, so that it acts upwards towards the joint; and, therefore, the distance  $de$  must be set downwards so that the arrow may act upwards from  $e$  to  $d$  to preserve the continuity of direction of the arrows from  $e$  to  $d$ , and  $d$  to  $a$ . The point  $e$  is thus absolutely fixed, and it becomes possible to complete the polygon of forces by drawing  $ef$  from  $e$  and  $bf$  from  $b$  parallel to the lines 4 and 5 (lying between the spaces  $e$  and  $f$ , and  $b$  and  $f$ , respectively) till they meet in the point  $f$ —which in this instance occurs at  $e$ , this being from the construction in a horizontal line with  $b$ , thus showing that there is no strain in the member 4. The direction arrows appertaining to the polygon  $abefda$  are the only ones shown on this diagram, to avoid confusion, and these show that all the members attached to the joint under the load are in compression. The completion of the diagram is now easy upon the lines already explained, there being no strain in the member 8—the only polygon in any way out of the common being  $bichf$ , representing the strains in the members 11, 10, 9, and 5, where  $bi$  and  $fb$  lie in the same straight line but in opposite directions.

Having so far cleared the way, the consideration of framed girders of any ordinary type should become a comparatively easy matter, and no difficulty whatever should be found in determining the strains in the members of the Warren girder shown in Fig. 69, so long as it is subject to only one load at any point. With the load as shown there would be no strain in the members 1, 2, and 13, while the member 12 would be in compression to the extent of the reaction of the abutment under it. The only polygon, the arrows pertaining to which are shown, is  $abghgf$ , representing the forces acting at the joint under the load; but all the other force polygons can be readily followed, the members 6, 10, 3, 7, 9, and 12 being in compression, and all the others which are subject to any strain at all in tension.

Girders of the form shown in Fig. 69 are not often employed, but they are occasionally of great value, especially when a bridge has to be thrown where there are two good natural abutments at different levels, the members 12 and 13 being dispensed with, 10 and 11 hanging on the abutment, as shown in Fig. 70, which is shown carrying a distributed load on the top flange. The members 1, 6, and 10 act as a continuous girder, although, as a rule, in practice they are calculated as three separate supported girders, each carrying a distributed load and being strained as girders, in addition to the strains brought upon them as parts of the framed structure. In either case, half of the load on 1 is carried by each of its abutments, and so with 6 and 10, making the loads on these supports  $\frac{W}{10}$ ,  $\frac{3W}{10}$ ,  $\frac{2W}{10}$ , and  $\frac{W}{10}$  respectively as shown, in proportions of the total load  $W$ . The load being distributed, the reaction of each abutment is  $\frac{W}{2}$ , and the setting-down of

the polygon of external forces is easy,  $\frac{W}{10}$ ,  $\frac{3W}{10}$ ,  $\frac{2W}{10}$ , and  $\frac{W}{10}$  acting downwards, and each reaction of  $\frac{W}{2}$  acting upwards, forming the closed polygon  $abdefa$ . The polygon to represent  $W$  and the strain in the members 1 and 2 is readily found to be  $abg$ —all lying in the one line  $ab$  on account of  $b$  and  $g$  coinciding, there being no strain in 1. Everything else is found as usual; but the polygon  $bcihfg$ , which represents the forces acting at the joint under  $\frac{3W}{10}$ , is worth notice, on account of the crossing of its boundary lines.

In the previously-considered cases it would have been possible by inspection to discriminate between the members in compression and those in tension; but in such instances as that given



in Fig. 70 this is by no means easy, and the arrows should be consulted. They are shown for the polygons of the forces acting about the joints under  $\frac{3W}{10}$  and  $\frac{2W}{5}$ , and denote that the members 2, 6, 10, 3, 7, and 9 are in compression, while all the rest are in tension, except 1, which bears no other strain than that which comes upon it as a beam bearing the distributed load of  $\frac{W}{5}$  to its two supports.

(To be continued.)

# PRACTICAL ARCHITECTURE WITH DETAILED ESTIMATES.—XXIV.

By HENRY LOVEGROVE, F.S.I., Surveyor.

AFTER the varied and interesting chapter given last week, we must proceed with the dimensions of the various trades:—

EXCAVATOR.

ft. in.	ft. in.	
78 6		
25 0		
1 0	1982 6	Dig and cart to surface.
21 0		
19 0		
1 0	399 0	Add.
4 0		
11 0		
1 0	44 0	Add.
31 0		
35 0		
1 0	1085 0	Add.
26 0		
18 0		
1 0	468 0	Add.
8 0		
17 0	136 0	Staffordshire blue brick, chamfered paving, bedded and jointed in cement laid to falls on and including bed of concrete 6in. thick, levelled to receive same to washing space.
2 1 9	3 6	Cutting do. to fit piers.
3 3 0	9 0	Circular do. do.
24 6 6	52 0	Rake, cutting, and waste.
6 0		
10 0	60 0	Portland cement concrete 9in. thick, finished with a smooth surface as paving to dung-pit.
10 0		
10 0	100 0	Granite pitching in small cubes, bedded and jointed in mortar on and including bed of concrete 6in. thick, levelled to receive same in yard to dung-pit.
1 6		
9 0	13 6	Add.
1 6		
8 3	12 5	
1 9		
2 3 0	30 0	Circular cutting to granite pitching. Portland cement concrete 9in. thick, finished smooth as before in tool-house and w.c.
5 0		
10 0	50 0	Add coals.
31 0		
17 9	550 3	Granite pitching bedded and jointed in mortar laid to falls, and bed of concrete 6in. thick levelled to receive same.
1 3		
2 9	8 3	Labour cutting and fitting granite pitching to piers.
2 3		
6 9	15 2	Add.
88 3		
3 2		
1 0	279 6	Deduct granite pitching for door-step.
91 6		
3 2		
1 0	299 3	Dig and cart to trenches and concrete (walls to dwelling-house).
44 9		
2 0		
1 0	89 6	Add (back wall to stables with return up to coals).
2 3 2		
3 2		
1 0	20 1	Add (wall of yard and dung-pit).
1 9		
2 0		
1 0	3 6	Add (piers for grates).
6 6		
2 0		
1 0	13 0	Add (between piers and toolhouse).
2 16 9		
2 0		
1 0	67 0	Add (front wall toolhouse).
56 6		
2 0		
1 0	113 0	Add (cross walls, coals, and coach-house).
18 0		
2 0		
1 0	36 0	Add (front wall of stables).
19 0		
2 0		
1 0	38 0	Add (cross between harness-room and stable).
9 9		
1 0		
37 9		
2 0		
1 0	75 6	Dig and cart to trenches and concrete (wall next dwelling-house).
2 5 0		
2 0		
1 0	7 7	Add.
2 5 0		
2 0		
1 0	20 0	Add (walls to pantry and stairs).
1 0		
20 0		Add (w.c.).

ft. in.	ft. in.	
2 1 2	2 0	
3 9		
1 0	7 6	Add angles.
2 3		
2 3		
1 0	2 6	
8 0		
1 2		
1 0	9 4	Add (chimney breast).
2 6		
2 6		
1 0	3 2	Add (angle do.).
7 6		
3 2		
1 0	23 9	Deduct (do. next bay).
10 9		
2 0		
1 0	21 6	Add (do. bay).
71 6		
1 8		
6	59 7	Add (sleeper wall).
2 5 9		
1 8		
6	14 5	Add fender wall.
7 0		
1 8		
6	5 10	Add.
3 2		
9		
1 0	9 6	Dig and cart and concrete (piers to front wall).
2 2 4		
9		
1 0	3 6	
2 2 10		
4 1 2		
1 0	2 2	Add (piers coach-house).
1 8		
4 1 2		
1 0	6	
2 10		
4 1 2	1 1	Add.
1 0		
2 10	3 4	Add.
1 0		
88 3		
3 2		
1 9	489 1	Dig and cart, part filled in, and rammed to footings.
54 6		
3 2		
1 9	523 8	Add.
44 9		
2 0		
2 9	246 2	Add.
3 2		
3 2		
2 9	55 2	Add.
1 9		
2 0		
2 9	9 8	Add.
6 6		
2 0		
2 0	35 9	Add.
2 16 9		
2 0		
2 3	150 9	Add.
56 6		
2 0		
2 9	310 9	Add.
18 0		
2 0		
1 9	63 0	Dig and cart, part filled, and rammed.
19 0		
2 0		
1 9	88 6	Add.
9		
1 9		
37 9	1 0	Add.
2 0		
1 9	132 2	Add.
2 5 0		
2 0		
2 3	45 0	Add.
2 2 0		
3 9		
1 9	18 2	Add.
2 3		
1 9	4 5	Add.
8 0		
1 2		
1 9	16 4	Add.
2 6		
2 6		
1 9	5 6	Add.
7 6		
3 2		
1 9	41 7	Deduct do. bay.
10 9		
2 0		
1 9	37 8	Add do.
71 6		
1 8		
1 9	208 6	Add.
2 1 5 9		
1 8		
1 9	50 4	Add.
7 0		
1 8		
1 9	20 5	Add.
3 2		
9		
2 3	21 5	Add.

ft. in.	ft. in.	
2 2 4		
8		
2 8	9 4	Add.
1 3		
2 24 0	48 0	Labour, raking, cutting, and waste on Staffordshire blue chamfered paving (in stable).
50 0	50 0	Labour, cutting and waste to do. (next gutters in loose boxes).
4 13 0	52 0	Add (at foot of stalls).
4 2 4 0	32 0	Add.
41 9		
16 6		
1 0	688 11	Raking do. and do.
10 6		
16 6		
1 0	173 3	Dig and cart (earth under paving of stable).
15 2		
15 9		
1 0	238 11	Add (harness-room).
11 9		
4 9		
1 0	55 10	Add (coach-house).
16 11		
8 9		
1 0	148 0	Add (coals, &c.)
37 11		
17 9		
1 0	673 0	Add (yard, &c.)
13 2		
10 6		
1 6	207 5	Dig and cart (under floors of dwellings).
4 9		
4 0		
1 6	28 6	Add.
6 0		
7 9		
1 6	69 9	Add.
12 6		
12 6		
1 6	234 5	Add.
87 11		
9	65 11	BRICKLAYER.
94 6		
9	70 11	3 B. Footings to walls of house.
44 9		
6	22 5	Add back wall of stables and return.
2 2 3		
1 11	3 5	1 1/2 B. wall, yard, &c.
6		
6	1 0	3 B. granite piers.
6		
6	1 0	1 1/2 B. between pier and tool-house.
2 16 9		
6	3 3	Add front wall of tool-house.
6		
56 6	16 9	Add cross walls.
6		
28 3	1 1/2 B. front wall of stable, &c.	
4 2 1		
6	4 2	1 1/2 B. piers.
2 1 6		
6	1 6	1 1/2 B. do.
2 1 6		
6	5	
18 9	9 0	1 1/2 B. next harness room.
18 9		
6	9 5	Add next dwelling house.
6		
37 9	5 1 B. add.	
6		
2 5 0	18 11	1 1/2 B. pantry.
6		
2 1 6	5 0	1 1/2 B. w.c.
2 2 0		
3 9		
6	3 9	Brickwork in angle chimney breasts.
2 2 3		
2 3		
6	1 3	Add
6 11		
9	5 2	1 1/2 B. chimney breast.
2 6		
2 6		
6	1 7	Brickwork in angle chimney breast.
7 6		
9	5 8	3 B. deduct for bay.
10 9		
6	5 5	1 1/2 B. bay.
71 6		
3	17 11	1 1/2 B. sleeper walls.
5 9		
3	4 4	Add fender walls.
7 0		
3	1 9	1 1/2 B. fender walls.
1 7		
6	10 1/2 B. piers.	
1 7		
6	10 2 1/2 B. do.	
88 3		
5 3	463 4	2 B. from top of footings to under-side of stone plinth capping.
94 6		
5 3	496 2	Add.
88 3		
18 9	1654 8	1 1/2 B. wall above plinth to top.
94 6		
18 9	1771 11	Add.
14 0		
11 3	157 6	1 1/2 B. deduct bedroom for half-timbered front.



	ft. in.	ft. in.	
2	11 3	213 9	$\frac{1}{2}$ B. deduct less thickness of walls to bedroom.
	9 9	11 3	$\frac{1}{2}$ B. deduct less thickness middle bedroom.
	37 8	216 7	$\frac{1}{2}$ B. deduct less height of wall next harness-room, &c.
7	9 9	460 8	$\frac{1}{2}$ B. deduct from panels.
	7 6	12 0	$\frac{1}{2}$ B. deduct for bay window.
	5 3	38 1	$\frac{1}{2}$ B. deduct plinth.
	10 9	69 11	1 B. bay.
	6 3	37 6	$\frac{1}{2}$ B. extra thickness for chimney next bay.
	6 0	12 5	Add.
	5 6	3 0	Add.
	4 0	2 8	Add.
	3 6	2 5	Add.
	3 2	2 1	Add.
	3 6	34 2	Add.
	9 9	40 3	3 B. chimney-stack.
	3 6	8 10	4 B. in cement, add cap.
2	3 0	69 0	3 B. chimney stacks.
	11 6	15 8	4 B. in cement cap.
2	3 9	34 2	Brickwork angle chimney-breast, ground-floor.
	2 1	101 3	Add do.
	13 6	28 6	Add first floor.
	2 0	39 5	Add.
	3 9	52 4	Add.
	10 6	27 4	Add.
	2 6	83 11	$\frac{1}{2}$ B. chimney-breast, kitchen.
	2 6	52 6	1 B. add bedroom over first floor.
	16 9	9 4	Extra to segmental arch in cement to bay window.
	2 6	9 6	Segmental centre, 14 in. soffit.
	8 9	27 9	2 B. in cement piers.
	6 4	87 6	1 B. in cement wall to dung-pit.
	13 5	112 6	1 B. walls to w.c.
	5 0	292 0	1 B. wall next coach-house.
	10 6	25 1	$\frac{1}{2}$ B. in cement piers to coach-house.
	8 9	321 11	1 B. side wall to coach-house next harness-room.
	11 3	103 0	Add gable.
	16 0	41 5	$\frac{1}{2}$ B. piers.
	18 3	6 8	1 B. over coach-house doors.
	1 2	10 0	1 B. deduct door to loft.
	17 2	427 6	1 B. wall next harness-room.
	12 0	103 6	Add gable.
	1 2	604 6	1 B. front wall of stables.
	17 9	13 6	$\frac{1}{2}$ B. piers.
	4 3	61 9	$\frac{1}{2}$ B. extra thickness above arcading.
	18 0	16 6	$\frac{1}{2}$ B. deduct for stone arches.
	23 9	321 9	$\frac{1}{2}$ B. above arcading.
	15 6		
	1 6		
	2 3		
	1 2		
	2 3		
	39 0		
	1 7		
	6 7		
	39 0		
	8 3		

	ft. in.	ft. in.	
	6 0	37 6	$\frac{1}{2}$ B. deduct for loft-door.
	6 3	18 9	1 B. wall next dwelling.
	17 0	9 9	Brickwork in angle.
	17 0	126 0	1 B. wall next dwelling first floor.
	18 0	103 6	Add in roof.
	11 6	28 0	$\frac{1}{2}$ B. extra thickness.
	4 0	37 5	1 B. over recess.
	7 6	5 0	Extra to segmental axed arch in cement over recesses.
	3 3	9 5	Centre to do, 9 in. soffit.
	5 9	104 5	$\frac{1}{2}$ B. ex. thickness under vertical tiling
	3 4	9 6	$\frac{1}{2}$ B. deduct do.
	3 4	143 0	1 B. sleeper walls.
	3 4	34 6	Add.
	3 4	14 0	Add.
	3 4	364 0	1 B. internal walls in dwelling.
	3 4	117 0	Half-brick wall in cement first floor.
	3 4	287 0	
	3 4	92 3	

#### EDINBURGH EXHIBITION OF DECORATIVE HANDIWORK.

THE Royal Scottish Academy have not, this year, seen their way to provide for an autumnal water-colour exhibition; but their galleries have recently been opened for exhibition of specimens of decorative handiwork, more or less intimately connected with the adornment of house interiors. The collection consists of two sections—viz., modern work, professional and amateur, and a loan collection of selected examples of old and modern work, the latter being the larger of the two. The professed object of the exhibition is not merely to interest and instruct the public, but to give an impetus to the taste for decoration in the furnishing of the house, and so provide for the encouragement of the professional artist, who will himself find in the collection of good examples instruction which he could not otherwise obtain.

The first impression on entering and making general inspection of the rooms is the preponderance of the antiquarian works of art and imitations. The large collection of old chairs and cabinets, and old furniture generally, gives a somewhat dingy aspect to the room, which, however, has been well relieved by some fine specimens of old tapestry hung on the upper portion of the walls.

The amateur collection is located in the first room, and is fairly well filled with many and varied specimens of needlework, carving, and repoussé, and other metalwork. Several are entered for the prizes given to competitors for excellence of execution and originality in the design. The embroidery is all of the domestic kind, from quilts and fire-screens to small bags and pincushions. The crewel-work generally shows skill in the artistic disposition of the foliage, and no better sample of such arrangement—rendered all the more effective by its happy choice of colour—could be devised than 117, "Silk Embroidery," original design by Miss Kilgour, for a cushion. Repoussé work appears to be very popular with ladies and gentlemen alike, and a very large number of specimens are exhibited in this room, the greater portion by members, mostly anonymous, of three societies which exhibit as "The Edinburgh Social Union Art Classes," "The Keswick School of Industrial Arts," and "The Corstorphine Brass Class."

The most conspicuous specimen of the Edinburgh School is a large hammered bowl, No. 26, which must have taken much precious time to make into its present form; it is not exhibited in its natural position, but tilted on its side to show the play of light and shade upon the surface. There are several imitations of Eastern work in trays and plaques, in brass and copper, most of them exhibiting considerable skill in

handling the material, but defective in the artistic arrangement or execution of the pattern; 46, "A Study of Tomatoes," in copper, is the work of a more skillful hand than most of the exhibitors in this department. The work of the Corstorphine School is mostly trays and such like articles, but is perhaps on the whole more generally up to the successful mark than the similar work of the other two schools; 85, "Brass Salver," by W. Middlemas, and 94 and 102, copper repoussé sconces, and 109, "Copper Mirror Frame," are of exceptional merit, both in the design and execution.

Gen. Sir F. W. Hamilton, K.C.B., exhibits inlaid work in white ivory and ebony, a table top and cabinet, 63 and 64, which are thoroughly artistic and workman-like specimens of handicraft. Miss Frazer Tytler sends three terracotta "busts," well modelled, and there are a few, but very few, specimens of lace and net-work, lent for exhibition.

The second and larger apartment contains the professional contributions, where the visitor at once recognises the superiority of the metal-work and carving, and the greater variety of the exhibits, including, as it does, plaster decoration, wall-paper designs, stone-carving, gold and silver work, wrought-iron work, and bookbinding of ornamental kind. In wood-carving, the amateur collection shows some finished specimens, but they generally lack the freedom and grace and sharpness of the examples sent by the more practised professional hand. These are too numerous for detail. The Renaissance style of different periods is well illustrated by Geo. Galloway, who signs himself "Apprentice."

213 is a figure subject, a panel by Andrew Millar, emblematic of Wood-carving. The expression and attitude of the female represented is excellent, whether or no the imagination succeeds in finding the relation she bears to the special industry in question; 229, George Gibson's "Group of Children," also a panel, and 227, "Scene from Tam o' Shanter," though lacking in the delicacy of detail, are very vigorous and telling. Some very fine specimens of Italian flower-carving are lent for exhibition by Lady G. Baillie Hamilton, and 238 is a portrait of Grinling Gibbons, the wood-carver, and his wife. 250, "Gothic Cornice Enrichment," is a good specimen of wood-carving by J. McCulloch, and faithfully shows the Decorated foliage work before it took the later and less natural embodiment.

252 is a very fine repoussé sconce by D. Stewart. 269, "Copper and Brass Alms Dish," designed by A. Benson and embossed by G. Northwaite, is very elegant in form and pretty in its combination of the metals and pattern depicted. There are a few specimens of electrotype work, a terracotta vase, and statuette of King James I., the last by J. McCulloch. Several specimens of mosaic work of secular and sacred subjects are exhibited by the Heaton's Cloisonné Co., Limited. 309 is a design for a Celtic Cross by Sam Wilson, of good outline, but lacking in its delineation of the interlacing work, which is arranged apparently without method or meaning, in many parts of the surface. A number of very elaborate and original specimens of covers for catalogues, decorative card-printing, designs for calendars, &c., are exhibited, of which the most elaborate is 314, a large sheet commemorative of the late Industrial Exhibition in Edinburgh. The border contains miniature pictures of work of the industrial manufactures, very prettily arranged, and brightly coloured.

There is one inlaid oak mantelpiece, of which the workmanship is much superior to the design, and some curious specimens of hand-painted Dutch tiles. 401—404, four painted panels for mural decoration by the late Thomas Bonnar, representing the four seasons, are good examples of draughtsmanship and colour. Winter is symbolised by youthful satyrs round a bonfire, and the other seasons in similar style. Two or three designs for stained glass are not of any note.

In a covered case are many very fine examples of engraved and embossed work. 425, in silver repoussé work, represents Christ and the Woman of Samaria.

There are very good specimens of wrought ironwork, by Starkie, Gardner, and Co., where the modelling is very tastefully executed. 466, 467, 468 are also good samples of this work



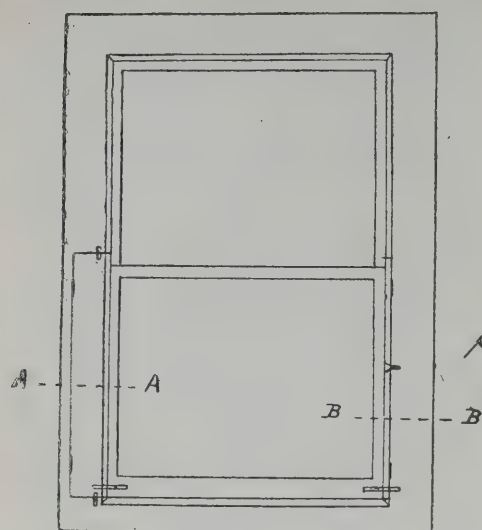


Fig. 1

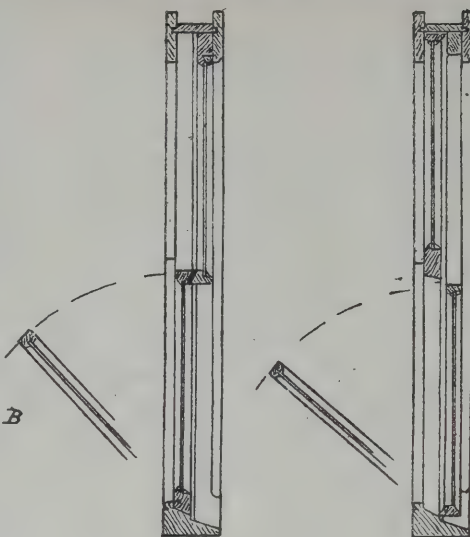


Fig. 2.

Fig. 3.

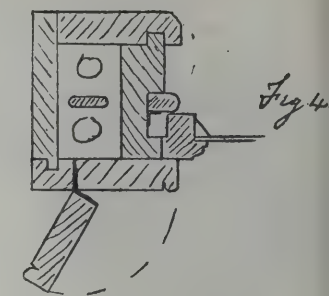


Fig. 4.

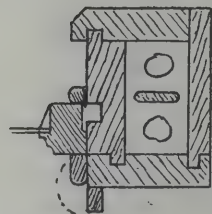


Fig. 5.

By Winfield, of Birmingham, who send also specimens of hammered brasswork.

The Octagon contains also specimens of plaster frieze decoration—mostly Renaissance—and many of the new artistic wall canvas-paper designs, and Messrs. Dobie and Son give sketches of interior decoration for principal rooms.

The Loan Collection fills the remaining rooms—about 700 exhibits—chiefly furniture of antiquarian make and interest, and work in brass. It contains a vast selection, of which a few probably will be able fully to appreciate the value, monetary or artistic. The catalogue in its prefatory note to the section, however, gives valuable information on many points, and a brief but lucid account of the characteristics of the furniture of the 18th century—the time of Chippendale and his successors. The passage opening into the large Octagon has something of the look of a broker's premises in the Cowgate, being entirely devoted to chairs of antique designs—Chippendale, Jacobean, and Sheraton chairs. Of these the Jacobean bear the palm for clumsiness, the Chippendale samples being more elegant. 11, "Chippendale Armchair," lent by the Lord President, is a good specimen of open work in back and arms, without the useless and dangerous-looking horns attached to the back of No. 10. The Sheraton examples, though less profusely decorated, are more tasteful and appropriate in their design. 34 is a mahogany armchair, once the property of Warren Hastings. There are several specimens of Scotch chairs, with crown or coronetted tops, and several from Holyrood. 94, a carved oak armchair, 1625, is a very homely but comfortable-looking specimen with rounded back. Her Majesty lends a splendid specimen of Louis XV. gilt tapestry-covered armchair. The Buhl work in a writing table and cabinet, lent by the Duke of Buccleuch, is considered to be of the very best character. The collection of specimens of old richly-gilt bookbindings is very extensive as illustrative of the art, and the samples of brass and iron work are also very varied and curious in their character and design.

#### WINDOW FRAMES AND HANGING SASHES.

MR. GEORGE EVANS, of 1, Adelaide-street, Charing-cross, W.C., has patented a useful invention, consisting in the construction of frames and sashes in such a manner as to enable the sashes to be opened inwards for cleaning, reglazing, and painting, and so prevent the use of ladders and the dangerous practice of servants standing on the window-sills to clean the outside of the windows—or the equally dangerous practice of over-reaching from the inside. Fig. 1 gives elevation of inside of an ordinary window, the left side having the lower part of lining hinged, which would save the usual pocket pieces and the

right side, another method giving the lower part of bead only as being hinged, so as to allow the sashes to fall inwards. Figs. 2 and 3 give sections of windows showing method of bottom and top sashes opening inwards, having two small flush bolts in the bottom rail of each sash which, when shot, will act as pivot hinges, the head of the frame being so constructed as to allow the bottom sash to be pushed up sufficiently high to clear the top sash when down for opening, the parting beads to the height of the lower sash to be hinged and fall back into grooves in the pulley stiles, and about 3in. of the outside beads at bottom to be cut away. The edges of the sashes to be rebated for the cords. Fig. 4 shows section of jamb at A A, and more fully explains the principle with inner linings to open. Fig. 5 shows section of jamb at B B, and more fully explains the principle with the inner beads to open.

The new invention consists (1st) in the general construction and simplicity in the disposing of the beads and parting beads, and rebating the edges of the sashes to allow the same to fall inwards. (2nd) The method of hanging the sashes with bolt pivots. (3rd) The construction of the head of frame to allow inner sash to go higher to clear the outer sash in opening inwards. (4th) The novelty of the whole, as when shut everything looks the same as the ordinary frame and sashes, and the extra cost of preparation is small. (5th) Existing frames and sashes can be easily altered without any great expense.

#### MUSICAL REQUIREMENTS IN CHURCH PLANNING.

A PAPER on this subject, illustrated by sketches, plans, and photographs, was read by Mr. John Belcher before the Institute on Monday, who pointed out that the development of ecclesiastical music of late years forced certain problems upon the attention of the architect, and that in church planning the position of voices and instruments had now to be considered. The first introduction of organs was in the 7th century; but they were generally used in conjunction with other instruments. Minstrels' galleries might still be found in small churches, the west end being the favoured position. During the period from Henry VIII. to Queen Elizabeth instrumental music was still adhered to; but the objections of the Puritans were such that in 1643 nearly every organ in use had been destroyed. From the Restoration, however, to the present day, organs were recognised as essential. It was only 50 years ago that 32ft. pipes were first used in England, although on the Continent the organ became very large at the end of the 15th century, reaching a climax in the 17th and 18th centuries. In most cases they were forced to migrate from the chancel to the west end, in some to the

transept, and, where neither position was available, they were relegated to the triforium of the nave. The choir being seated in the chancel, the position of the organ near them seemed essential; but other eventualities, such as additional bodies of singers and an orchestra, had to be remembered. In future church planning these requirements would have to be considered. The organ should be in a position not less, or much less, in height than the nave and transepts, and it followed, therefore, that the so-called "organ-chamber" was a mistake. The size of an organ should not be regulated by the size of the building, but by the number of "stops," the combination of which regulated the extent of the volume of sound. A good foundation tone was always necessary, to secure which speaking-room had to be provided for 8ft., 16ft., and even 32ft. pipes on the pedal organ. These dimensions had to be borne in mind in providing sufficient space. While deprecating any attempt at smothering the tone of an organ in a chamber, he held that some protection should be given to the instrument. The top of a chancel-screen or rood-loft was hardly a suitable position for an organ of any size, as, although it possessed attractions from an artistic point of view, it was prejudicial to the organ tone. Organists and organ-builders generally considered that in fairly large churches the organ should be raised above 12ft. above the ground, but not more, and a divided organ could not be recommended. Proper and easy access to every part for repairs and tuning should be provided, and attention given to the position and space for the "feeders." Whatever power was adopted for the supply of wind could also be utilised for the dynamo, by which electric light could be provided with incandescent lamps capable of use within the instrument, and so avoid the risk of fire from candles or matches struck in so dark and dry a collection of woodwork. An equable temperature was also important. The keyboard and organist's seat should be separate from, but close to, the instrument. The organ-case might be treated as an inclosure in the way usually adopted by the Italians, having no special relation to its contents, wholly or in part concealed; or in the general, and the author thought appropriate, way, of using some of the pipes themselves as decorative features in a framework inclosing the other parts of the organ. He protested against the use of iron in the construction of an organ-case, while wood was a material in sympathy with the organ, and the most consistent for the construction of its case. Sound travelled so slowly that any division of choir, organ, or orchestra was destructive of precision, and they should therefore be compactly arranged, and as far as possible on the same plan. It was unadvisable to place the organ in a transept between the choir and the congregation. Mr. Belcher then described a sketch of a plan by himself to illustrate his meaning. The organ



was placed in a special transept east of the great transept, equal in height to the rest of the church, and forming the western end of the morning chapel; it was virtually open on three sides, but was slightly sheltered; outside the main wall, and between the buttresses, a staircase with a wide landing served as a tuning-place for an orchestra before entering the gallery; this gallery, projecting into the chancel, gave place for an orchestra, which might be extended eastwards if required. The floor of the organ was 12ft. from the ground, the music gallery was lower, and as the floor of the chancel was raised by steps, all the performers were brought into close relation with each other and the organ. The usual north transept afforded an excellent position for grouping large bodies of voices during oratorios and festivals adjoining the organ and orchestra, and easily under the control of a conductor at the western angle of the gallery. A corresponding gallery on the opposite side of the chancel could be provided for female singers at ordinary services.

A short discussion followed.

## MASONRY AND STONE-CUTTING.\*

By LAWRENCE HARVEY.

### EIGHTEENTH LESSON.

AROIN FORMED BY THE INTERSECTION OF A SPHERICAL DOME WITH A BARREL VAULT, THE CENTRE LINE OF WHICH DOES NOT MEET THE CENTRE OF THE DOME.

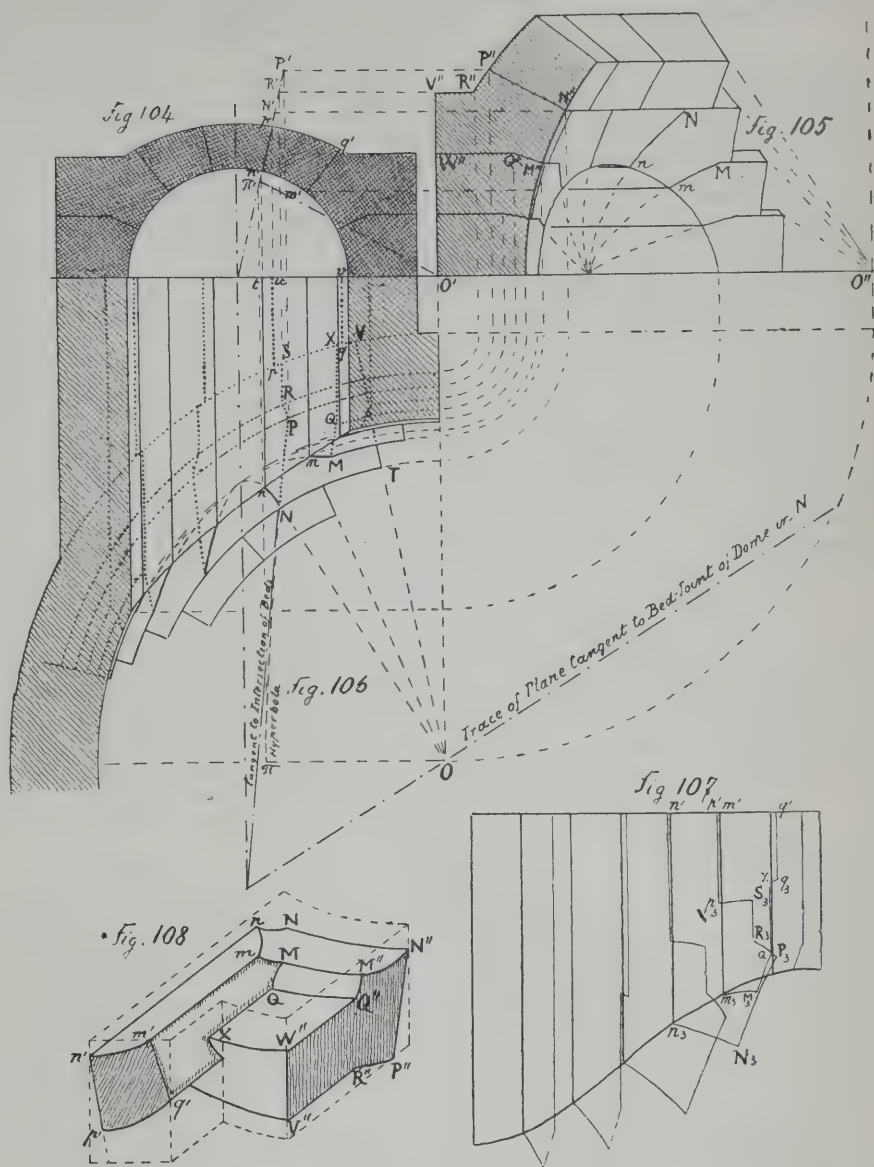
IN Lesson V. we have studied a similar intersection of vaults; but then the cupola was supposed to be constructed in concrete, whereas here it is constructed in stone, and, therefore, the stones which form the groin belong to both vaults, the barrel vault and the dome.

In Fig. 104 we have the square section of the barrel vault. Below it, in Fig. 106, we show the plan of the dome and the barrel vault which penetrates it. To find the plan of the groin formed by the intersection of the two surfaces, exactly the same methods are used as in Lesson V. (Jan. 20), where they are fully explained. But to determine a proper division of voussoirs in each vault we make a section of the dome (Fig. 105), placed by the side of the section of the barrel vault. We begin by drawing the jointing of the dome, and then divide the barrel vault in divisions small enough so that the first joint of the vault be lower than the first joint of the cupola. Here it is no more a question of taste, but, if this precaution be omitted, we shall be landed in inextricable difficulties; for the conical bed-joints of the dome will intersect the cylindrical soffit of the vault and give us joint curves of a most complicated nature.

The reader, no doubt, remembers that the groin is obtained by cutting both soffits by horizontal planes, and that the intersections of the bed-joints with the soffit of the dome are arcs of circles, which are projected on plan as portions of ellipses such as  $nN$ ,  $mM$ .

After reaching the point  $N$  on the bedjoint of the dome, the plane of the bedjoint of the vault intersects the cone of the bedjoint of the dome. Points of this intersection are found by cutting both the plane of the vault joint and the cone of the dome joint by a series of horizontal planes. The intersection is, of course, a conic section; in the case of the joint  $n$  the intersection is an hyperbola projected on the plan in  $\pi N P$ . To find the point  $\pi$  we have drawn (Fig. 104) the line  $O'\pi$  parallel to  $O'P'$  (Fig. 105). To find tangents to these intersections of the bed-joints, the plane tangent to the conical bed-joint should be combined with the plane of the bed-joint of the vault. The points where these tangents cut the axis of the barrel vault will serve as usual for finding the tangents to the real curves of intersection when drawing the bed-moulds.

From the point  $P$  the plane of the bed-joints cuts the extrados of the dome along the line  $PR$ , which is really an arc of a circle projected on plan as a portion of an ellipse. Then from  $R$  to  $S$  the bed-joint cuts the horizontal plane  $V'R'$  of the dome voussoirs (Fig. 105), and from  $S$  to  $p$  the cylinder which forms the outside face of the lower rings of the dome, after which from  $p$  to  $u$  the bed-joint cuts the extrados of its own vault along a straight line.



Such are the series of intersections which have to be found to produce the voussoirs of this groin.

To give a clearer idea of the arrangement of the joint lines of this structure, in Fig. 105 an elevation of the arch and some of the voussoirs of the dome is given; but this drawing is not required for working the stones.

In Fig. 107 we give the development of the soffit of the barrel vault, and the moulds of the several bed-joints, all which are found by the usual methods. Some of these moulds are somewhat complicated, such as the one marked  $n_1 n_2 N_2 P_2 R_2 S_2 p_2 p_1$ .

In Fig. 108 the voussoir is shown turned upside-down. To work it, a prism is formed which has a base equal to the plan of the stone  $t n N T V q v t$  (Fig. 106), and the height of which is equal to the difference of level of the points  $m'$  and  $P'$  (Fig. 104). On this prism the head moulds  $m' n' p' q'$  and  $M' N' P' R' V' W'$ , taken from Figs. 104 and 105, will be delineated. Then it will be easy to work the cylindrical soffit of the stone, and the planes of the bed-joints starting from  $n' p'$  and  $m' q'$ . The plane of the bed-joint  $n' p'$  can be worked right through the stone, and the mould of that joint  $n_1 n_2 N_2 P_2 R_2 S_2 p_2 p_1$  (Fig. 107) will be placed thereon to delineate its outline. On the other hand, the plane of the joint  $m' q'$  must be worked progressively, until its bed mould can be exactly fitted thereon. The horizontal joint  $XQ'Q'W'$  is easily worked, and its outline is given on plan (Fig. 106), by which we are able to delineate the curve  $Q'Q'$ . The conical joint belonging to the dome can then be worked from the curve  $Q'Q'$  with the aid of a bevel set to the angle  $W'Q'Q'M'$  (Fig. 105). On that conical surface the upper edge  $MM'$  can be trammelled. The edge  $NN'$  of the upper bed is also easily delineated on the concave cylinder forming

part of the operation prism. We have now delineated all the lines  $MM'$ ,  $Mm$ ,  $mn$ ,  $nN$ ,  $NN'$ , which surround the spherical soffit of the stone, and guided by these lines it is easy to work the surface with the help of a templet cut to the section of the dome. The upper conical bed-joint is easily worked, as it presents no peculiarities beyond the joints of ordinary domes. The extrados  $P'R'$  would be worked with a concave templet, and the remainder of the stone offers no practical difficulties whatever.

Before leaving this subject, let us ask ourselves what would be the consequence of determining beforehand that the groin shall be a straight line on plan? This means that the intersection of both surfaces is contained in a plane; but the only line of that kind which can be drawn on a sphere is a circle. It follows, therefore, that the shape of the groin will be a circle, and as this groin is also a section of the cylinder of the barrel vault, it follows also that the square section of the barrel vault will be an ellipse, the vertical axis of which will be larger than its horizontal axis. Thus, it would be feasible to construct a perfectly regular cupola on pendentives over two parallel barrel vaults, or over the crossing of four barrel vaults, two running side by side parallel in one direction, the two others running side by side at right angles with the former. We see thereby, also, that it would be possible to start from the eight arches which support the cupola of St. Paul's, a nave and two aisles in one direction, and a cross vault at right angles with them without its presenting the slightest appearance of trickery. The only irregularity would be that, if the nave were semicircular, the aisles would have to be of semi-elliptical section.

(To be continued.)



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## ILLUSTRATIONS.

THE NEW FACADE, MILAN CATHEDRAL.—KILPECK CHURCH, HEREFORDSHIRE.—NEW TOWN HALL, LYDNEY.—NO. 64, FINSBURY PAVEMENT.—WOODHOUSE GRANGE, NEAR LEICESTER.—SIDE OF A ROOM WITH INGLE FIREPLACE, FOR MESSRS. FOSTER AND COOPER.—AN OLD OAK CHAIR.—SKETCHES AT MESSRS. PHILLIPS, SON, AND NEAL'S.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

NEW WEST FRONT, MILAN CATHEDRAL — (SELECTED DESIGN).

IN THE BUILDING NEWS for Nov. 16 last, we published drawings of the only English pre-matured design for the new facade of Milan Cathedral. To-day we illustrate the selected design by Signor Giuseppe Brentano, of Milan, from drawings sent us by the architect for publication. Unfortunately, these were not so well rendered as we could wish—indeed, the Italians are singularly behindhand in their mechanical reproduction processes. We have, however, done our best with the material placed at our disposal, and the details of the front herewith will serve to elucidate the general elevation of the facade also represented, with some plans also printed on the sheet. The author of the chosen design is a son of Sig. L. Brentano, a well-known engineer of Milan, and was a pupil of the Royal Upper Technical Institute of that city. Among other prizes won by him was the Travelling Studentship awarded by the authorities of Siena some three years ago. During the excursion thus allowed him, Sig. Brentano is reported to have taken occasion to study several of the most celebrated cathedrals in Europe with a view of preparing his design for the new west front of the Duomo at Milan. At first he published in the journal *L'Illustrazione Italiana* a composition flanked by western towers, and though in general idea the chosen design follows the original scheme sent in by the author for the preliminary competition, the towers are now omitted, and the outline generally has been consequently simplified. The general perspective published in the elaborate report issued by the architect in illustration of his design at once demonstrates how thoroughly suitable the new front will be, and the general idea of it certainly harmonises with the rest of the building. In making their award, the jury seem to have been almost entirely unanimous in favour of Sig. Brentano, and so have not very fully described their reasons for the selection at any great length; but they declare that his design is undoubtedly the best and well worthy of execution. The prize awarded for the chosen plan was 40,000 lire (£1,600). We have already printed a list of the award of all the prizes.

## KILPECK CHURCH, HEREFORDSHIRE.

THIS highly interesting example of early church architecture, situated near the Wye in the midst of the hilly woods which once were known as the Forest of Haywood, is remarkable chiefly on account of the triple arrangement of its plan dividing the little building into nave, choir, and sacristy, which has an apsidal end. The interior view which we

give to-day illustrates this division looking from the west end into the chancel. In the central area stands the large old massive font, which consists of a huge basin, 4ft. 6in. diameter, cut out of a block of pudding-stone. The bowl is very shallow and the base is modern. In 1848 Mr. Cottingham, the architect, repaired the church, and mended some of the grotesque carvings, which give such a charm to this ideal Norman church. A corbel table runs completely round the building outside under the eaves crossing the west facade at the same level. It is supported by about 80 corbels, each carved differently—some rich with figure sculpture, with such subjects as the Agnus Dei or grotesque furies, while in others plain zigzags are employed. The west front has no opening in it, and a central buttress runs up to support the corbelling already mentioned. From the ends and centre of this course projects three brackets, 3ft. in length, in the fashion of crocodiles' heads, like that on the great Norman tower at Bury St. Edmund's. The south doorway is remarkably fine, and is often quoted as a typical example of Norman design. The Tree of Life is represented in the tympanum, but without any human figures introduced, and it is a highly conventionalised composition of foliage. Large dragons enrich the side shafts, and surrounding the main arch is a beautifully sculptured course, elaborated with the signs of the Zodiac. The two photographs reproduced herewith are by Messrs. Poulton and Son, of Lee. The interior is plain; but round the chancel or first arch is a wave enrichment, and on the respond piers are a series of full-length figures of acolytes, marked with the stigmata in their hands and feet, and each figure bears one of the emblems, candle or bell, chalice or paten. These are unique, and date about 1150.

## LYDNEY TOWN HALL.

THIS is a Victoria Jubilee scheme, successfully promoted by a number of the townsmen and gentry of the neighbourhood of Lydney in the Forest of Dean, who have formed a Limited Liability Company for the purpose. It includes a hall 74ft. by 40ft., a large combined reading-room and library, and a committee-room, with ample cloak-room, green-room, and all other conveniences. It occupies a central site in the town, close by the ancient Gothic cross, with which it will group well. The building will be faced with the local red Forest stone, and used in combination with Box Ground Bath stone for dressings; but to neutralise the violence of contrast, the red rubble will here and there retain part of the greenish-grey flakes formed in the vertical vents of the blocks. Red Broseley tiles will be used for the roof. The heating will be by low-pressure steam. Messrs. Jones and Co., of Gloucester, are carrying out the work from the designs and under the superintendence of Mr. W. Howard Seth-Smith.

## 64, FINSBURY-PAVEMENT, E.C.

THE front is of Portland stone and bed granite, with projecting porch and bay window. In some of the rooms the walls are finished with polished Parian cement, and decorated by Mr. Boekbinder for the tenants, Messrs. James Pullar and Sons, of Perth. There is a large basement extending over the whole of the site. The premises were built by Mr. W. Downs, Hampton-street, Walworth, for Messrs. Davis and Conolly, Botolph House, Eastcheap. The cost of the building is £3,300. The architect was Mr. W. H. Woodroffe, A.R.I.B.A., 214, Great Dover-street, S.E.

## "WOODHOUSE GRANGE," NEAR LEICESTER.

THIS house has been built in that remote locality known as "Woodhouse Eaves," about nine miles from Leicester. The situation is a great attraction to the place. It contains four reception-rooms, billiard-rooms, nine bedrooms, and the usual kitchens and servants' accommodation. The architect was Mr. Chas. Granville Baker, of 5, Bloomsbury-square, W.C.

## SIDE OF A ROOM, WITH INGLE NOOK.

THIS side of a room, executed in hard woods, comprises a projecting inclosure with side seats, forming an inglenook, with cupboards for china and other things on each side of the fireplace. Over the mantelshelf are two panels of looking-glass. Marble verges inclose the

tiles which line the grate-place. At the side, in the corner of the room, is a bay window, as seen in the drawing. Over the opening leading to it is a quarry-glazed screen in clear glass. It was designed by Mr. M. B. Adams for Messrs. Foster and Cooper, of Nottingham.

## AN OLD OAK CHAIR.

THIS sheet of drawings illustrates one of a pair of interesting Arm Chairs which were found at Norwich. The inscription on the back (same on both chairs) is in Spanish-Italian, and has been translated thus—

"Since fortune wills that my hope should go to the winds, Weep I will not for time lost (nor) stop ever sad and discontented."

This inscription is cut in the solid oak. There was a William Tyrell of the Essex Heron branch living in 1461. He was a Knight of St. John of Jerusalem, and probably a great traveller: hence the reason for putting the inscription in a foreign language. There was a branch of the family seated at Gipping, Stowmarket, in Suffolk, and the chairs may have belonged to a member of that branch. The two chairs are now in the possession of Mrs. W. M. Tufnell, of Hatfield Peveril, Essex, who is a daughter of the late Sir John Tyrell, Bart., the last male heir of the Essex Tyrells.

Chelmsford.

FRED CHANCELLOR.

## SKETCHES AT MESSRS. PHILLIPS, SON, AND NEAL'S.

OUR sheet of sketches is taken from objets d'art lately sold at Messrs. Phillips, Son, and Neal's room. The miniature Louis XVI. Writing Cabinet was a marvellous and exceptional piece of furniture, elaborately inlaid, mounted in beautiful chased metal-work, with an old Sèvres plaque in the centre panel, the upper part forming a jewel case, the centre fitted with a sliding desk, mirror, writing drawer, pigeon-holes, and fall front. This beautiful cabinet was fitted with numbers of secret drawers, little spring table, fitted with ink, &c., and was altogether as fine a piece of Louis XVI. work as we have ever seen at the sale rooms. It was formerly the property of the Countess Jacovski. The Corner Cabinet was of Louis XV. period, mounted with scroll work of finely-chased ormolu and rare marble top. The Louis XVI. Cabinet Table was inlaid with kingwood and satinwood, and mounted in beautifully-chased ormolu mounts. The Louis XVI. Cabinet, next it, had a cylindrical fall front, fitted with a sliding writing-table and two drawers below. All this furniture belonged to Lord Suffolk, and was of the genuine type now getting rather rare in London sale rooms.

## ARCHITECTURAL ASSOCIATION VISIT

ON Saturday, Dec. 15, the Class of Construction of the Architectural Association paid a visit to the Engineering Laboratory at University College, Gower-street, W.C. The members were received by Professor Kennedy, and a series of very interesting experiments were performed, including testing the tensile strength of wrought-iron bar and plates of varying thicknesses, steel plates, and Portland cement briquettes, and the compressive strength of various specimens of wood, including mahogany, oak, pitch-pine, yellow pine, deal, &c.

A wonderfully sensitive and beautiful piece of mechanism was shown by the inventor, M. Ascroft, by means of which a graphical representation of the gradual extension and ultimate fracture of a piece of bar steel was automatically traced on a piece of smoked glass.

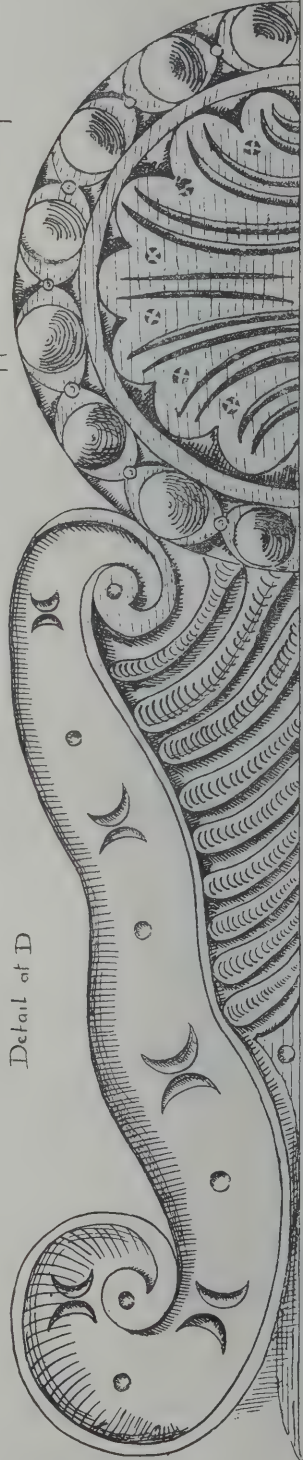
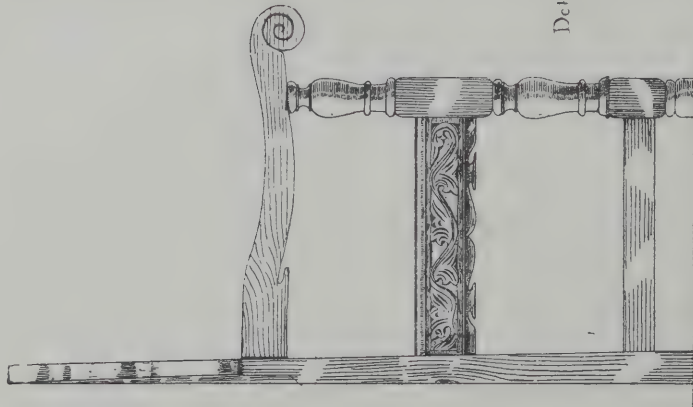
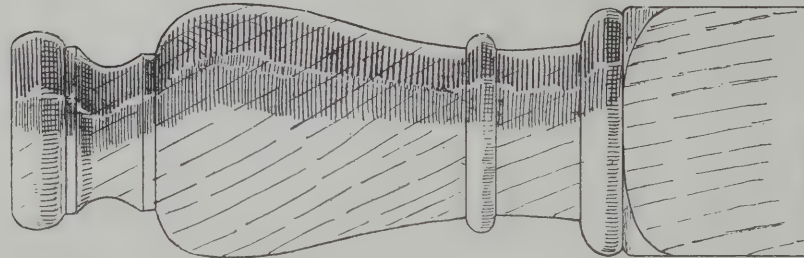
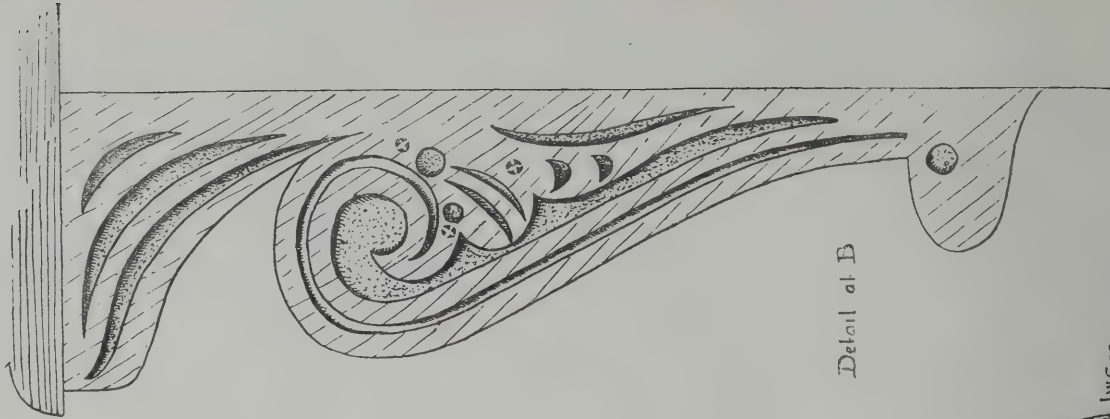
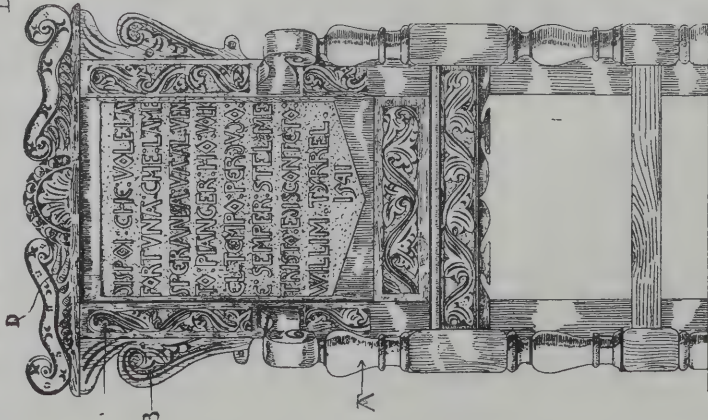
The experiments were rendered doubly interesting by the clear and lucid explanations of Professor Kennedy, and at the conclusion of the visit a very hearty vote of thanks was given to the Professor for his kindness in taking so much trouble in preparing the many beautiful and instructive experiments that were performed. Professor Kennedy expressed the great pleasure it gave him to do anything for the Association, and, after an additional vote of thanks had been given to the Professor's able assistant, Mr. Ascroft, the meeting terminated.







OLD ARMCHAIR.



J.W. Cress  
Ment & Day  
New York

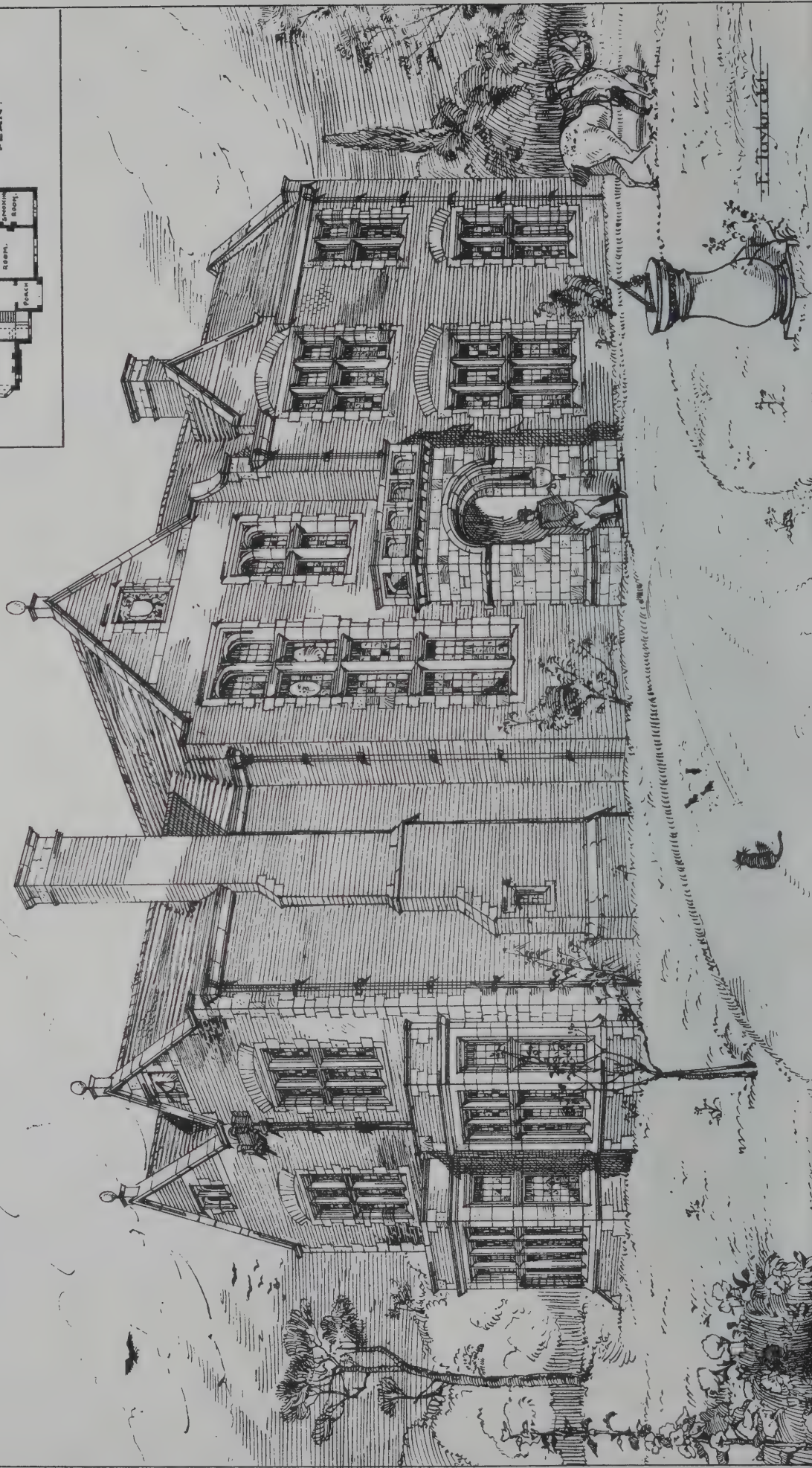
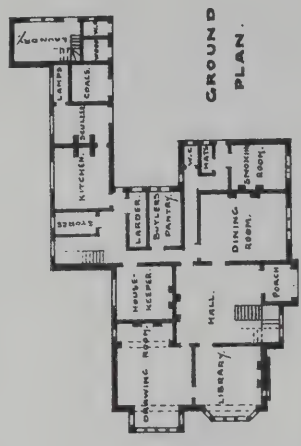






# "Woodhouse Grange" by Leicester

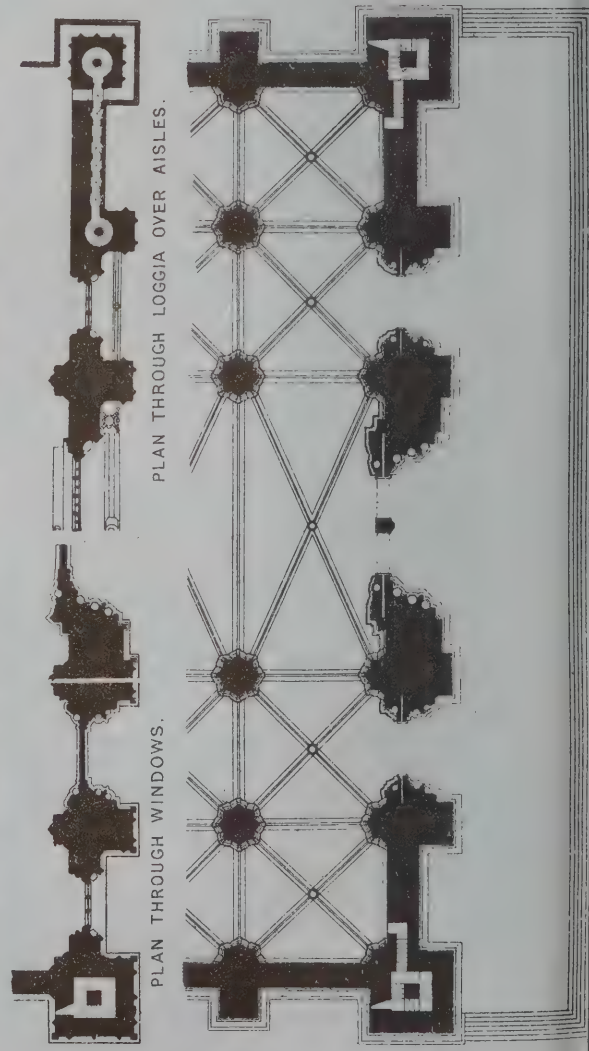
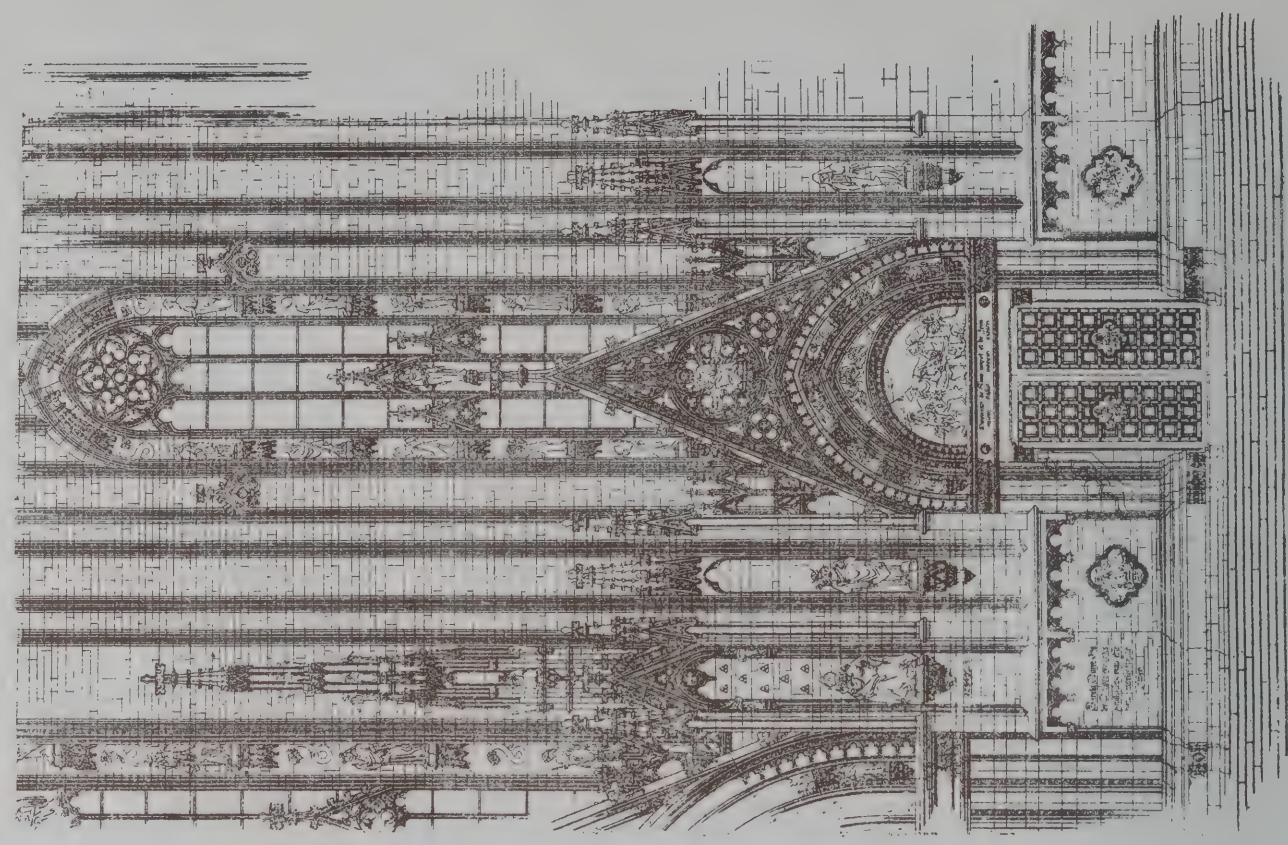
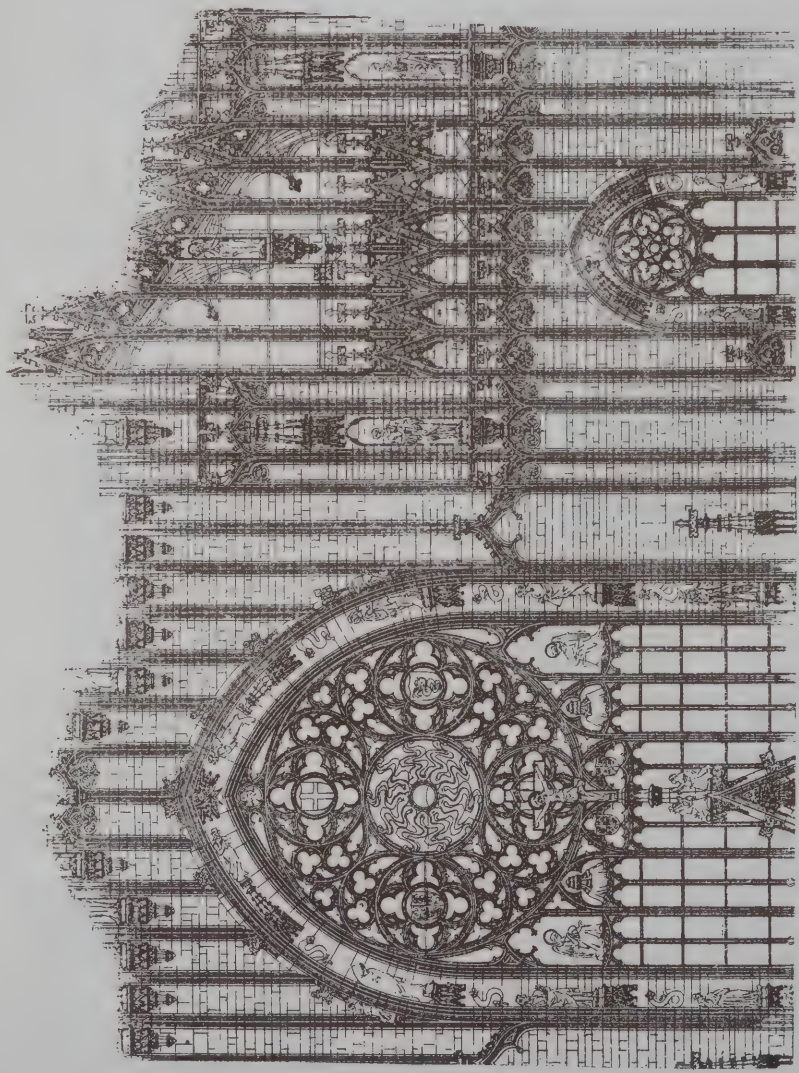
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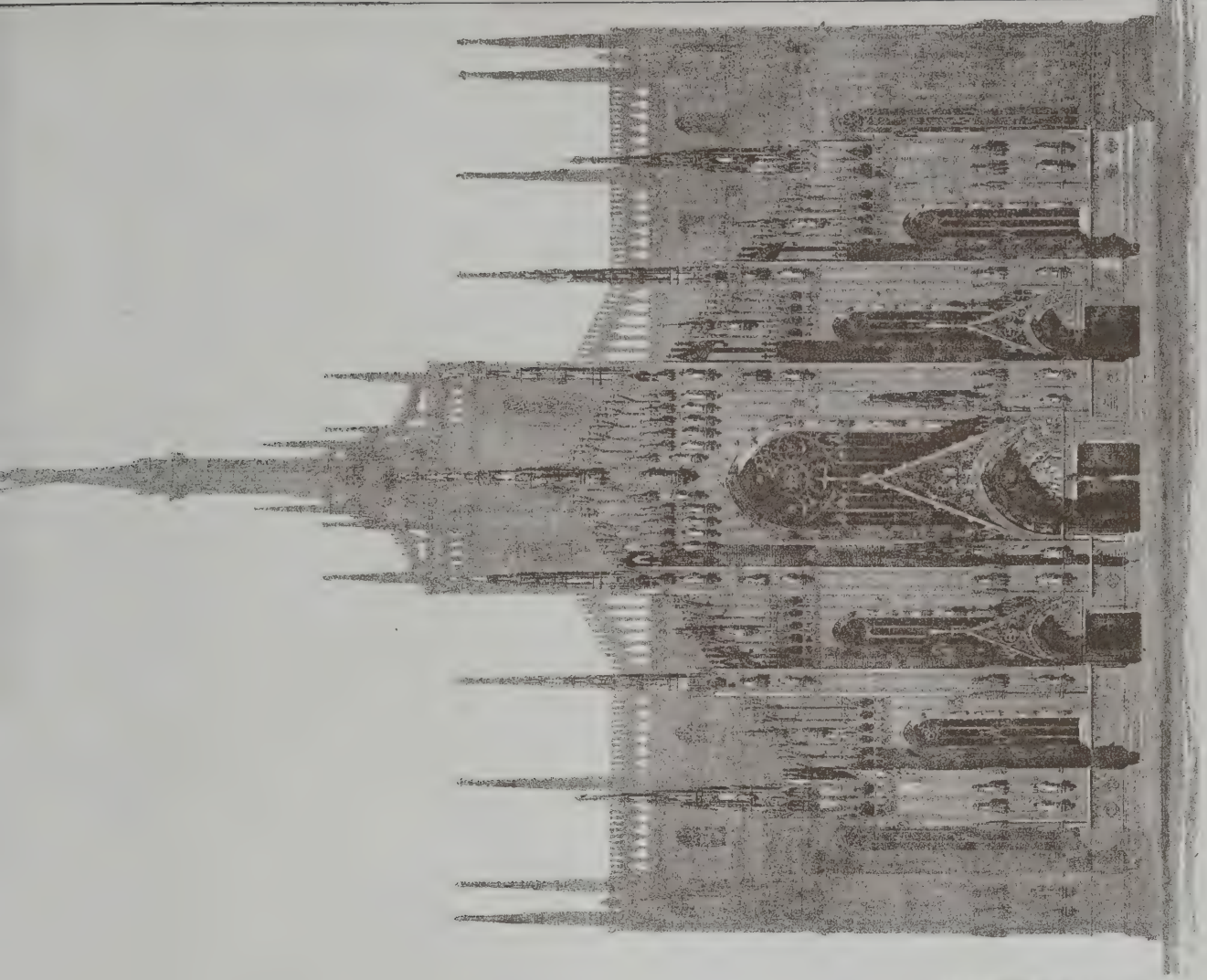
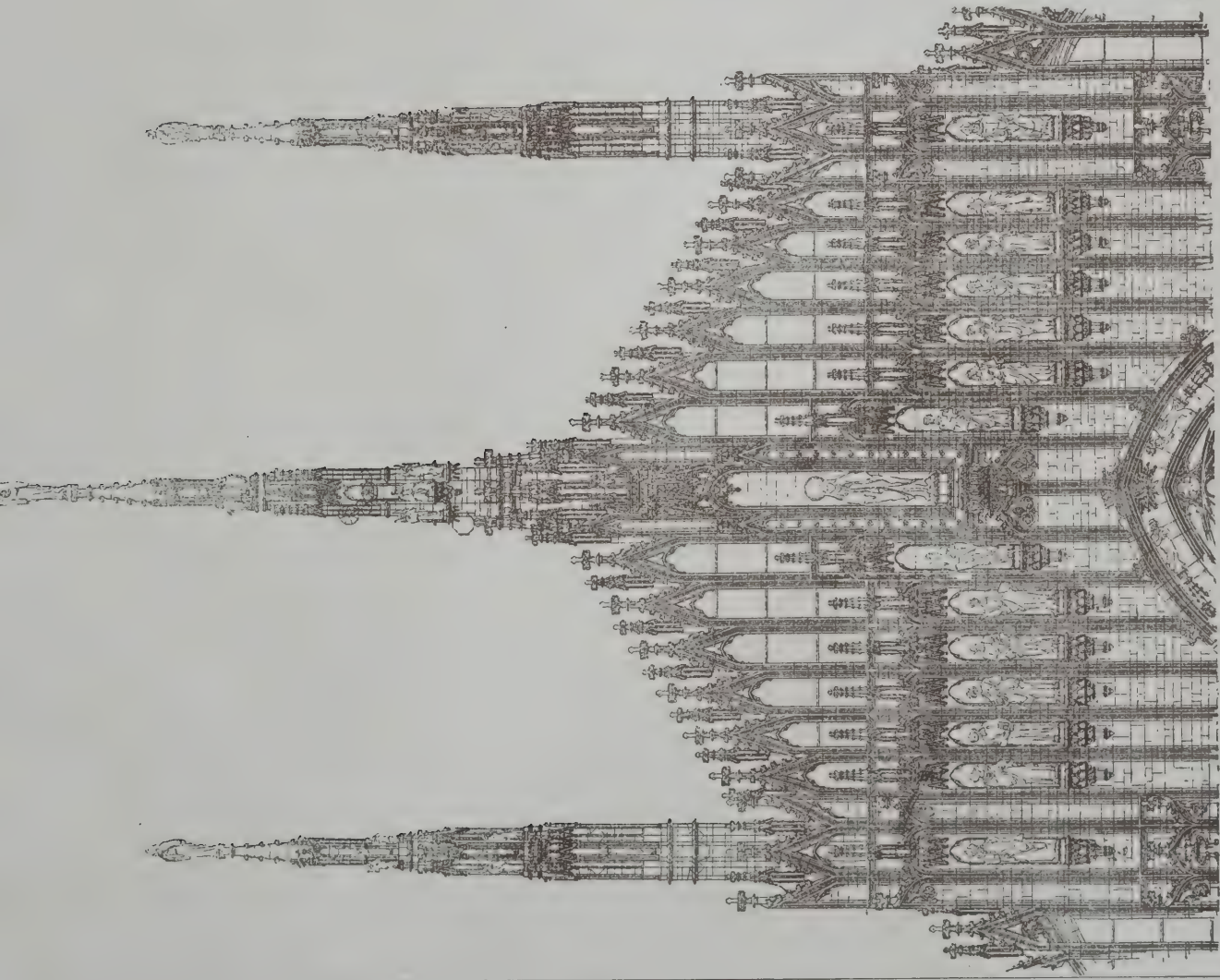




PLAN THROUGH LOGGIA OVER AISLES.

PLAN THROUGH WINDOWS.





"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C.

MILAN · CATHEDRAL · SELECTED · DESIGN · GIUSEPPE · BRENTANO · ARCHITECT



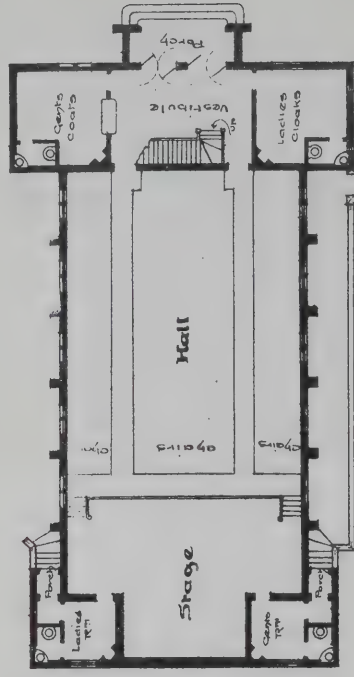




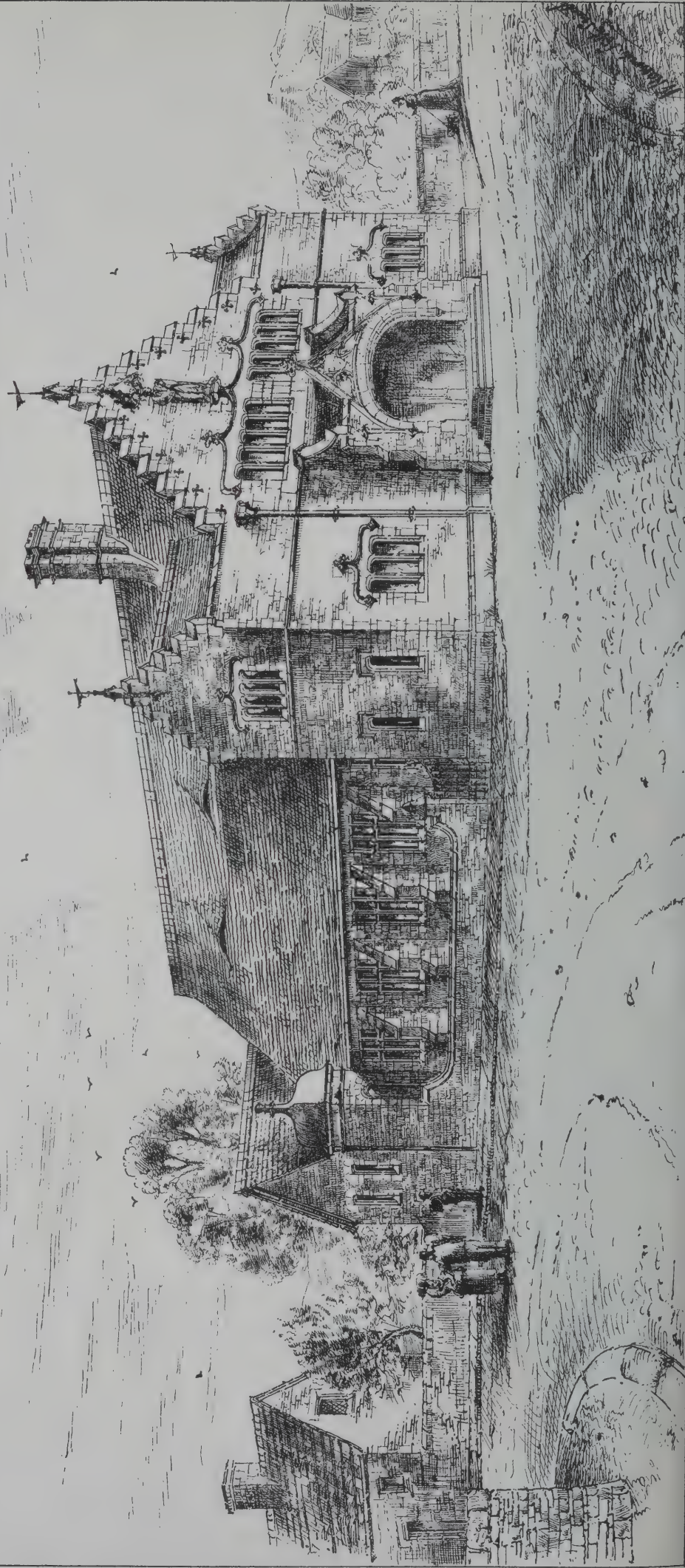




New Town Hall.  
Lydney.  
Gloucestershire.  
W. Howard & Co. Architects.



Scale of Feet  
0 10 20 30 40 50 60 70 80 90 100







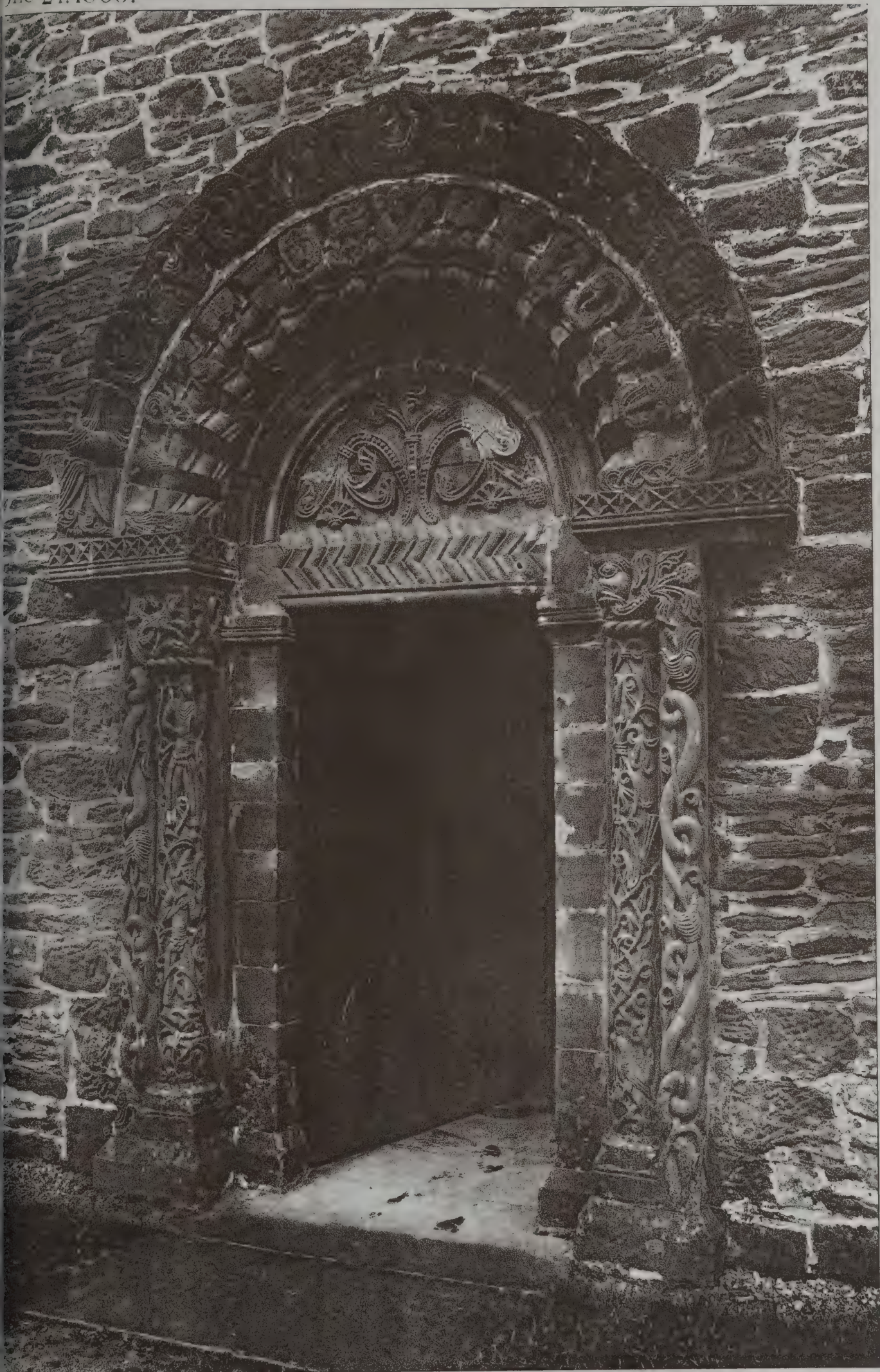




PHOTOGRAPHED BY POULTON & SON.



DEC 21. 1888.



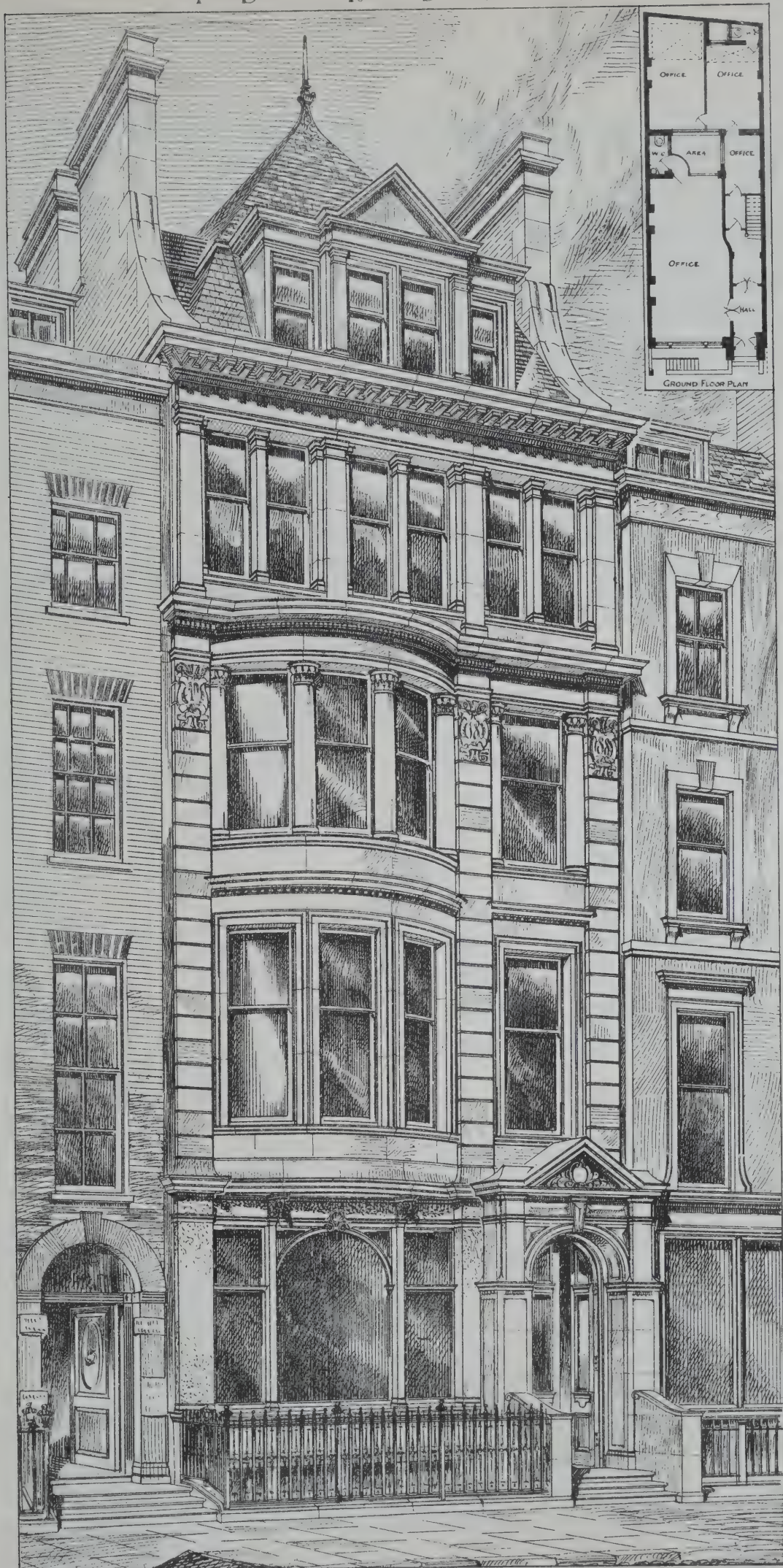
"PHOTO-TINT" by James Akerman, 8, Queen Square, London, W.C.

HEREFORDSHIRE.









No 64 Finsbury Pavement E.C. Waller H. Woodhouse Archt

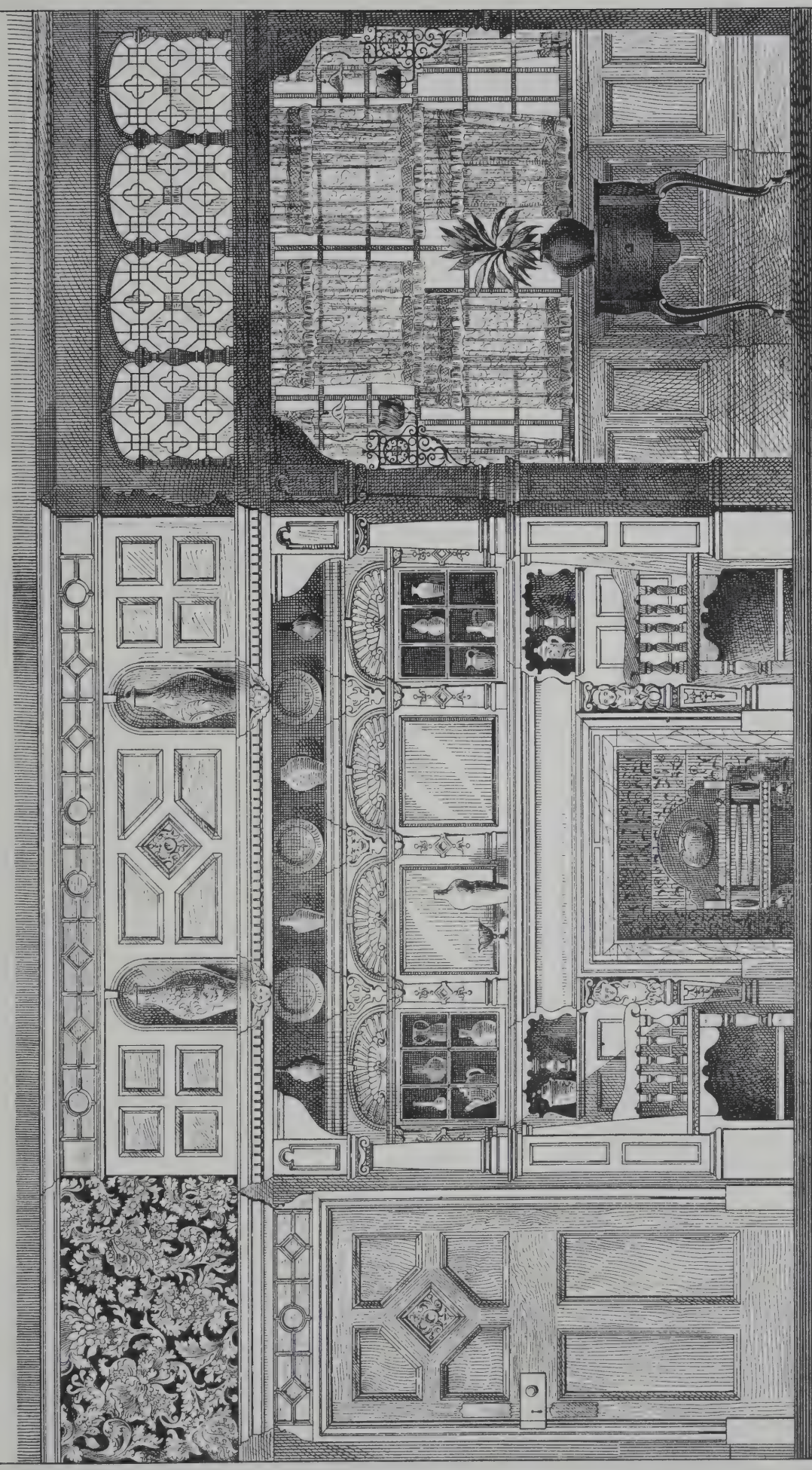






# SIDE OF A ROOM WITH "INGLE" FIREPLACE

Made by FOSTER AND COOPER 63 & 64 LONG ROW NOTTINGHAM.



PROJECTING INGLE NOOK FIREPLACE

BAY WINDOW

Scale of Feet  
1 2 3 4 5 6 7 8 9 10 11

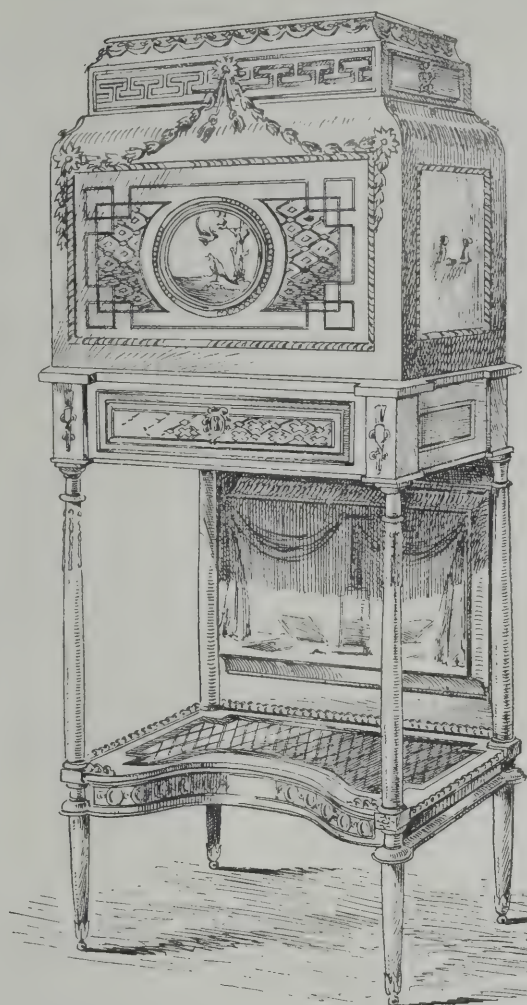
designed by MAURICE B. ADAMS F.R.I.B.A.  
ARCHITECT

Photo Lithographed & Printed by James Ackerman, 6 Queen Square, W.C.

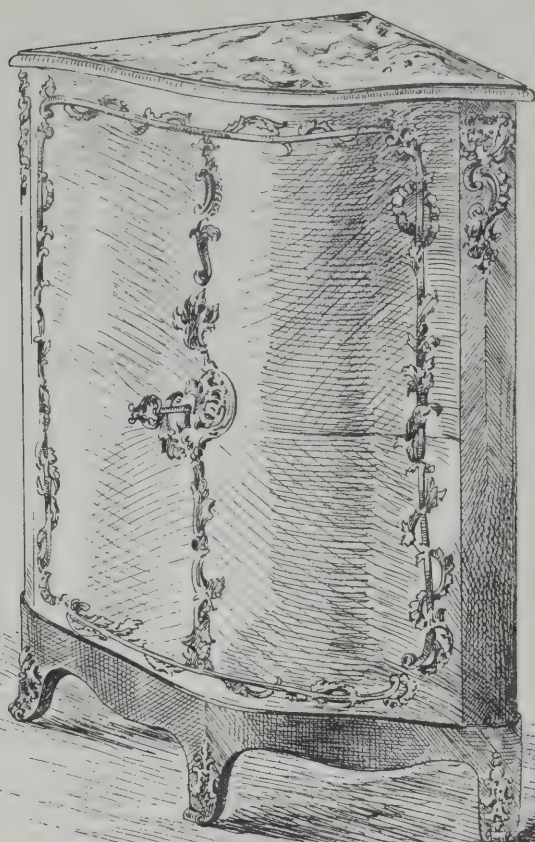




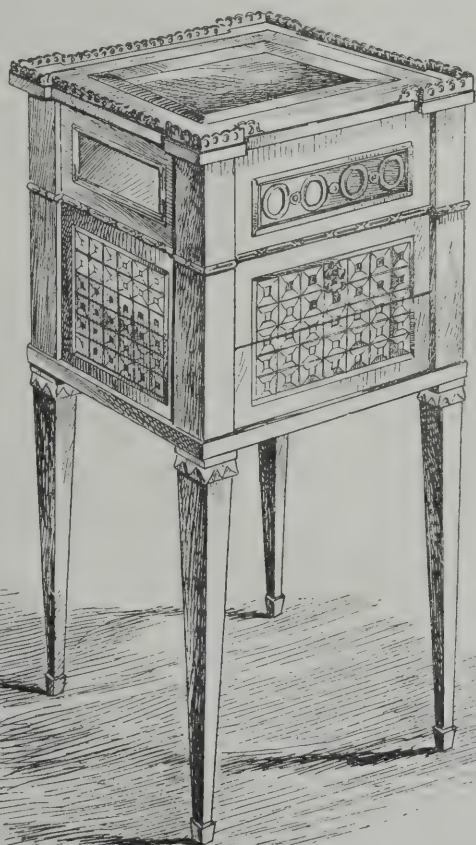




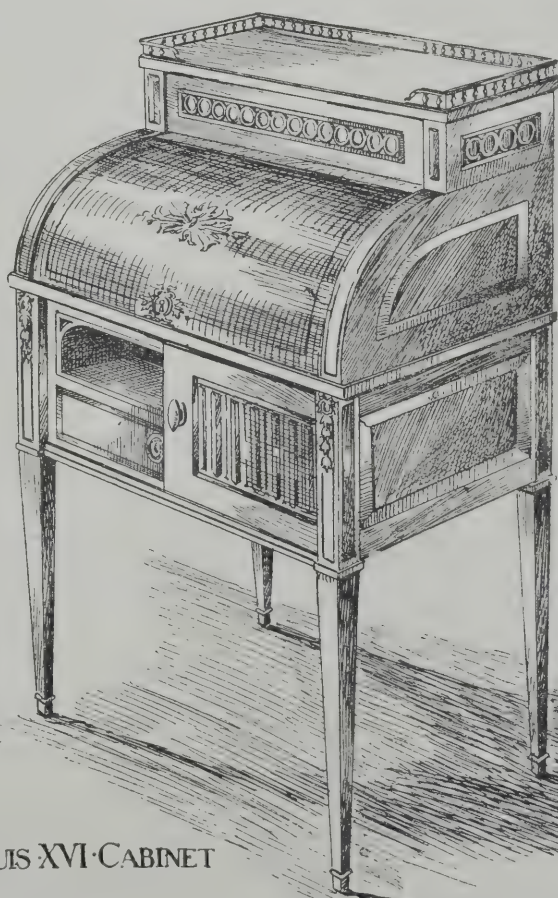
MINIATURE LOUIS XVI · WRITING · CABINET



LOUIS XV · CORNER · CABINET



LOUIS XVI · CABINET · TABLE



LOUIS XVI · CABINET







## INLAND NAVIGATION.—III.

IT is curious that our means of transport by water on the large scale should be the most extensive and perfect in the world, while on the smaller scale of inland water transport it is much inferior to that of some other countries which compete with us in providing easy and inexpensive means of transit for heavy goods. This appears to have arisen from the idea that inland navigation would compete with railway transit for such goods. It has, however, of late been frequently demonstrated that this need not be so, if an intelligent distribution of traffic between the two modes of conveyance be regarded. The establishment of water carriage in England on an effective basis need not interfere with the financial results of railways, for it would not only relieve them of the bulk of their least remunerative class of traffic, but enable them to provide better accommodation for passenger traffic, as well as for the very extensive class of light and valuable manufactured goods. It would, in all probability, greatly reduce the wear and tear of the permanent way and some of the bridges—those, namely, of riveted iron plates or bars, the stress upon which is now much greater than it was formerly, and although the masonry bridges may be strong enough to sustain any traffic whatever, yet it is a question which surely must have forced itself often upon the attention of railway engineers, whether girder bridges are not being too rapidly deteriorated by the increasingly heavy loads they have now to carry. It may be said that they are the best judges of this, and that if they make no complaint to the traffic-managers the public need not be concerned, nor if, again, on complaint being made, orders for renewal are immediately given by the directors, whatever the cost may be, to secure safety to their property and to the public; but, nevertheless, this would not cover the whole ground of controversy, nor would it be a complete answer to the allegation that railway structures are being unduly worn out by the heavy traffic to which they are now subject. Heavier rails also are required, as well as more frequent renewal; but this may be regarded with less interest, perhaps, than some other points in question, because heavier rails may equally be required for increased speed of the passenger traffic.

However these minor points may be determined, the main consideration remains, that water conveyance is more suitable for minerals, building materials, and certain heavy manufactured goods than railways are. The goods trains have to be delayed at frequent times on the route to allow passenger trains to pass them, and although they proceed at greater speed when going, yet, on the whole, the saving of time by railway transit is not of so much importance as it appears to be, when contrasted with the slower speed of canal and river navigation. There would be difficulties, no doubt, to be contended with in some cases in converting some of the present small waterways into such as would be large enough for present requirements; but it is only on the main lines of canal routes that much enlargement would be required, except that nearly all locks would have to be widened, some deepened, and some lengthened; but it has been pretty fairly estimated that all this, and whatever besides is necessary to make present canals what they ought to be, can be done at an expense which would be financially profitable if the dimensions were made large enough to allow of a speed about twice as much as the present rate of travel on canals, for it is absolutely necessary that if the rate of travel be increased the dimensions of the canals must be greater than some of those at present existing. The enlargements, it is estimated, would cost from £5,000 to £10,000 per mile,

perhaps averaging not more than £6,000. The cost of transit of goods, compared with that by railway, would be less than a fourth part of the present charges, after making full allowance for working expenses, maintenance, and 5 or 6 per cent. interest on the outlay.

In 1878 it was determined in France that the canal lock should be made uniform in dimensions—viz., 126ft. long, 17ft. wide, and 6ft. 7in. deep on the sill of the lock gate. These dimensions allow boats of 120 tons burden to pass. After an examination of the English canals by Mr. F. R. Conder, C.E., he found (excluding the Gloucester and Berkeley canal, which is of large dimensions) that the 135 miles of the Grand Junction line of canal between London and Birmingham had locks 87ft. 6in. long, 15ft. wide, and a depth of 5ft. of water on the sills, allowing the passage of an 80-ton boat; and this is the nearest approach of the English canals to those of France, omitting also the Aire and Calder. It resulted from the same investigations that the economy of transport by canal is much superior to that by railway. The cost of railway maintenance is remarkably steady, rising and falling to a certain extent with the increase or diminution of the amount of traffic. On canals, the fixed expenses demand a certain sum in any case, which is not increased by increase of traffic in the same proportion as on railways.

It is necessary, nevertheless, in speaking of the cost of transport by canal, to take into consideration the approximate amount of transport to be provided for. For this purpose a traffic of 600,000 units of net load may be taken, though this is much less than the capacity of a canal of even moderate dimensions. At this amount of duty it is calculated that, in order to pay a dividend of  $4\frac{1}{2}$  per cent. on the capital cost, the rate of freight on an ordinary English canal comes to £154 per 100,000 units, or less than four-tenths of a penny per ton per mile. On the French canals the freight is one-third of a penny per ton per mile; in Belgium, two-tenths of a penny; on the large canal navigations of the United States, one-tenth of a penny. But on the Aire and Calder Canal, where very special arrangements have been made for carrying coal, it was stated, in evidence before the Select Committee on Canals, that the cost of freight has been reduced to five-hundredths of a penny per ton per mile. On the Taff Vale Railway, which is a mineral line, the carriage of coal is stated to be eighty-eight hundredths of a penny per ton-mile, and on the Maryport and Carlisle Railway three-fourths of a penny. Thus the possibilities of the two systems of carriage of minerals and heavy goods are shown in strong contrast. But it cannot be denied that canal traffic is slow: the passage of locks is a great hindrance. The loss of time in passing locks caused by the discharge of water from one level to another can be calculated exactly for any particular lock, and varies from four to eight minutes; but the time lost in entering and leaving the locks is not so easily ascertainable, although it is very little when the traffic is well regulated. Much time, and much water also, might be saved by doubling the locks—placing them in pairs, side by side—and saving in many cases half a lockful of water by discharging the top water of one lock into the adjoining one.

But the best way of saving both time and water is to substitute hydraulic lifts, such as the one now existing and in daily work at Anderton, in Cheshire, on the Weaver Navigation, which at that point joins the Trent and Mersey Canal. This lift was constructed under the directions of Mr. E. Leader Williams—now the engineer of the Manchester Ship Canal—when he was the engineer of that navigation. About 20 miles of the river Weaver has been made navigable for large boats, which carry the great salt traffic from Cheshire into the river Mersey above

Liverpool. Some particulars of this navigation, upon which many other improvements have been made since the lift was constructed, were stated by Mr. J. A. Sauer at the Conference on Canals at the Society of Arts in June last. The first Act of Parliament for making the river Weaver navigable was obtained by three Cheshire gentlemen in 1721, but under that Act the depth was not to exceed 4ft. 6in., and it was only possible to enter it from the Mersey at high water of spring tides, the boats carrying from 40 to 50 tons. The locks were built of timber. About the year 1760 the navigation was deepened so as to allow vessels to enter with nearly all tides; and in 1810 a further great improvement was made by the construction of the Weston Canal, four miles long, from Weston Point on the Mersey, by which the dangerous navigation of the lower part of the river Weaver was avoided. In 1830 the depth was increased to 7ft. 6in., and the locks made 88ft. long and 18ft. wide, passing vessels with cargoes of 100 to 150 tons. There were at this time eleven single locks on the river. About 1860 a second set of locks was built alongside nine of the old ones, having 10ft. depth of water on the sills, 100ft. long and 22ft. wide. Vessels were built specially to pass these locks, of nearly the same size, and carried large cargoes. These locks were again replaced about 14 years ago by others of much larger dimensions, the number being again reduced. The new locks are built of masonry, with limestone sills and rubbing courses, the intermediate courses being sandstone; but at Hunts and Valeroyal the new locks are built of concrete up to the water level, with stone quoins, and above that level are faced with masonry similar to that of the other locks. The number of locks has thus been reduced to four pairs on the whole length of 20 miles. The larger one of each pair is 220ft. long and 42ft. 6in. wide, with 15ft. depth of water on the sills, and most parts of the river are now dredged to a depth of 12ft., there being only a few bars upon which there is a depth of 10ft. The ordinary width is from 95ft. to 100ft. at the water-level, and 45ft. in the bottom. The new locks are large enough for a steam flat, towing three barges carrying 250 tons each, or 1,000 tons cargo in all. The lock is filled or emptied in six or seven minutes, and the whole time occupied from entering to leaving a lock is ten minutes. At Anderton, about 12 miles from the Mersey, the river Weaver runs near the Trent and Mersey Canal, the canal being 50ft. above the river, and here boats are transferred from the one level to the other by means of a double hydraulic lift, consisting of two iron troughs 75ft. long, 15ft. 6in. wide, and holding a depth of water of 5ft. The total weight of water and trough is 240 tons, its centre resting on the head of a ram 3ft. diameter, which moves vertically within a cylinder placed in a pit below it. There is a pair of these troughs and hydraulic lifts, side by side, and they are put in motion by filling the upper one with 6in. greater depth of water than the lower one contains, the effect of which is to raise the lower trough through  $\frac{1}{16}$ ths of the full lift, the remainder being performed by hydraulic pressure derived from an accumulator, which is kept up by the continuous working of a small engine. A communicating-pipe between the two ram cylinders enables them to be worked alternately with the same body of water, there being on the pipe valves admitting water either way. The lift is performed in  $2\frac{1}{2}$  minutes by an expenditure of the canal water not exceeding 6in. in depth over the area of the trough, the preponderating weight of which is sufficient to overcome the resistance of the machinery in raising the other trough weighing 240 tons. The weight of each trough is, of course, the same whether it contain a loaded vessel or an empty one, or none, the depth of water alone governing







gave the committee the opportunity of examining the concrete at the bottom, which they considered was quite imperfect, and Mr. Scadding and himself, both practical men, agreed that it was not at all what it ought to be. Then it was found that between the concrete and the wall there was a leakage which allowed the water to escape all round the tank. The committee further reported that Claridge's asphalt was *not used*. The architect, in answer to that, admitted that he knew that the contract was not carried out, and that he had told the contractor he did not use proper asphalt. But the architect did not report this to the committee, and it was nearly twelve months after he had given his certificate that they knew anything about it. The next thing was the roof of the reservoir. The rain water found its way through and ran into the tank, and the covering, which ought to have been  $\frac{3}{4}$  in. cement, was only  $\frac{1}{4}$  in., and that was broken up and cracked in many directions. Mr. Scadding and himself both took samples of that and showed it to the committee, who measured it and found it to be only  $\frac{1}{4}$  in. The architect on that said there was no concrete on the roof. But the committee never said there was. Then he also said it was  $\frac{3}{4}$  in. and not  $\frac{1}{4}$  in. Besides that, the roof was to be covered with four coatings of tiles, but the committee discovered that it was covered with only three coatings of tiles. Then in the contract a sum of £472 was set down for pumping mains and valves, and a pumping engine. He had never been able to see the pumping engine, and it was impossible that without a pumping engine £472 was required to bring the pipes up to the reservoir. The architect ought to be required to explain what had become of the pumping engine, or why that sum of money had been put in and no allowance made. The architect had power to amend his certificate, and he thought he should be required at once to do so. Why should the council accept less than the specifications? At present they had paid about £1,100 for a reservoir which was of no service to them, and he doubted if it ever would be. The reservoir at this moment was a mere cumbrer of the earth. Singularly enough, nothing was said in the specification about the reservoir having to hold water—(laughter). As to the proposed settlement, a sum of £500 was decided upon by members of the committee, and the builder was called before the committee and asked whether he would take that sum, which he refused. He did not know upon what calculation a sum of £500 was arrived at.

It was ultimately decided that the report of the sub-committee should be adopted.

#### EXAMPLES OF OLD ENGLISH HOUSES.\*

THE drawings we have published from time to time of old English houses have been among the most valued of our illustrations, as many readers have told us. Many such will like to possess the volume under notice, which comprises many which have been drawn for us by Mr. Maurice B. Adams. We are not quite clear as to the advisability of the inclusion of some of the new work at the end of the volume—not, we may say at once, that we think the author has any reason to fear comparison with the old, but that a title is a title, after all. Many people, however, will probably pardon Mr. Adams for the solecism in his title on account of the practical usefulness of some of his illustrations of modern furniture, and all will certainly admit that the volume is a useful and interesting selection from our pages, and a desirable addition to an architect's library or the bookshelves of people of taste.

#### ELEMENTARY BUILDING CONSTRUCTION.†

AMONGST the recent elementary manuals intended for students preparing for examination in building construction, Mr. Edward J. Burrell's little volume ought to be noticed. The author is second master of the People's Palace Technical Schools, and has

\* Examples of Old English Houses. Drawn by MAURICE B. ADAMS. London: B. T. Batsford.

† Elementary Building Construction and Drawing. By EDWARD J. BURRELL. London: Longmans, Green, and Co.

thought fit to throw into the form of a textbook his notes of lectures. The examples given are suitable, the illustrations are numerous, and clearly described in the letterpress. Thus the joints used in carpentry and joinery are succinctly explained, and sections or sketches given of them, one merit being that the diagrams are all figured. Thus, in the details of kingpost truss construction and dovetail tenons, every part is figured. Floors are carefully classified and treated, and a great deal of practical information is condensed in the pages of this section. Improvements are noticed, as in the case of the substitution of iron for wall plates, and the cement fillet bearing for ends of joists. Trimming and trimmer arches, and strutting joists are fully described, also the plan of using iron stirrups over girder to carry ends of binders. The methods of employing rolled-iron joists, pugging floors, laying floorboards, &c., are illustrated. The chapters on slating, plumbing, and iron roofs receive more attention than they usually get, and the framing of doors and windows is rendered intelligible to the student by numerous well-drawn details. The diagrams will serve as data for scaled drawings. Appended are notes on the materials used in construction, syllabus, and examination papers set in former years by the Science and Art Department. The numerous exercises are a useful feature of the book, which is one of the best we have seen.

#### OXFORD.\*

THIS handsome volume will interest a wide circle of admirers. The University man will prize it, if only as a memento of his *Alma Mater*; the townsman will hail it as the most complete and artistic record of the monuments of his famous city; and the artist and archaeologist will ungrudgingly recognise the skill and loving care with which Mr. Fulleylove has exercised his gift of draughtsmanship. Many of the illustrations have been done before in water-colour, and the whole were exhibited last spring at the Fine Art Society's Rooms. The architectural student will, of course, in many cases regret the absence of detail; but the drawings, whether in tint or pencil—the majority are in pencil—are well reproduced, are among the best of their kind we have seen. No one who has any connection with or affection for Oxford should neglect to secure this most happily executed record of her charms.

#### BUILDERS' IRONMONGERY.

THE Illustrated Nett Trade Price List, issued by Messrs. O'Brien, Thomas, and Co., 228 and 229, Upper Thames-street, E.C., is a complete repertoire of builders' ironwork. A glance at the various sections comprised in the index will be sufficient to show the comprehensiveness of the work, and the extent of this well-known firm's business. It comprises rain-water goods, stoves, tiles, hearths, mantels and overmantels, open and close fire ranges, gas cooking stoves, railings and gates, stable fittings, builders' ironmongery, sanitary goods, electric bells and fittings. Each section has a nett price-list intended for the trade only; but copies for the counter, with gross or retail prices, are supplied to customers, the average profit being 20 per cent. To take a few of the prices for rain-water goods, 3 in. pipes of 6 ft. lengths are quoted at 8d. per yard; 4 in. pipes, 11d. per yard. Flat heads for 3 in. pipes are 1s., and for 4 in. 1s. 5d. each. Moulded gutters vary from 10d. per yard for 3½ by 2 in. to 2s. 5d. per yard for 6 in. by 5 in. The section on register stoves contains several excellent types with firebrick backs and sliding bars, some with hobs; slow combustion stoves, including the "Parsons" stove with blower; the prices vary from 9s. 6d. to 32s. 6d. each, according to quality. The Godwin tiles for stoves, hearths, and paving are of the best quality, and have been used in some of the principal churches. No cheaper or nicer designs can be had than those priced at 6s. 4d. per square yard nett, as delivered on rail at Hereford. A more ornamental class of tiles are the Minton's glazed tiles, suited for stove panels and hearths. Various designs printed in colours are given; some of them very chaste, and the colours

\* Oxford. Illustrated by JOHN FULLEYLOVE, R.I., with Notes by T. HUMPHRY WARD, M.A. London: Fine Art Society.

tasteful. The quoted prices for panels of six tiles long is from 6s. 9d. to 12s. per pair. Those who require moderate stoves will find the illustrated list of tile register stoves useful. The prices quoted include those with and without tiles. Some handsome canopied stoves and dog stoves are illustrated. The ranges, open and close, are equally varied in assortment, and the builder or house-furnisher cannot fail, by the aid of this list, to select the range he requires. A very neat open-and-close fire kitchener, known as the "O'Brien Exchange," is shown. It can be easily converted from a close to an open fire, and thorough ventilation is insured by an arrangement at the back. There are five different qualities made. A 42 in. kitchener with oven and boiler of No. 4 quality costs 83s.; a 48 in., 89s. 6d.; but the same kitchener is made as low as 38s. 6d. A self-acting cottage range with oven and boiler is made at as low a figure as 12s. 9d. The "Stanley" and "Larbert" kitchen ranges, besides several other well-known varieties of portable ranges, are included. Gas-stoves follow. We cannot notice in detail the railings and gates, the stable fittings, containing some of the latest and best manger sets and stable gutters. Messrs. O'Brien, Thomas, and Co.'s builders' sundries show every article required in the furnishing and ornamental ironmongery, to which reference is made in the specification, and the sanitary section is a complete list of all the most approved closet-traps and appliances. In the preparation of architects' specifications or builders' quantities or tenders, this little guide will be found of practical use.

#### BOOKS RECEIVED.

*Practical Surveying: a Textbook for Students, &c.*, by GEORGE W. USILL, A.M.I.C.E. (London: Crosby Lockwood and Co.)—The object which the author of this textbook has in view is the instruction of gentlemen preparing for colonial surveying and students who are intending to follow the business at home. Mr. Usill thinks there was an opportunity for a more explicit work on the subject, and as he has had experience in giving courses of lectures, he is justified in bringing out a new work. We think more space has been devoted to surveying instruments than was required, our experience being that to simplify the beginner's notions of these aids is the main thing. Still, the remarks are very useful to advanced students. We are inclined to think that the chapter on trigonometry as applied to surveying is too much of a treatise, and that a less display of trigonometrical formulæ would have been not quite so formidable. Nothing can be more to the purpose than the remarks in the introductory chapters on the methods of using and holding the chain, crossing hedges, the hedge and ditch problem, taking offsets, ranging lines, slopes, and other matters which the ordinary treatises have scarcely noticed. Logarithms and the practical solution of triangles are clearly explained; so also are the subjects of theodolite surveying, traversing, and plotting by tabulating the sides of triangles; and the remarks on taking angles of streets in town surveying will be found complete and very serviceable to the young surveyor. Levelling is another section, and is treated in a perfectly clear manner, with examples showing the right way of taking the levels. The chapters on contouring and setting out curves are usefully given, and some valuable advice on office work. The author's book is full of accurately-drawn diagrams, which no other book of the price contains. Ease of reference and study is also insured by dividing the chapters under separate sections, with clear type, and the work is certainly comprehensive and practical. —*Practical Elements of Construction*, by PERCY L. ADDISON, F.G.S., A.M.Inst.C.E. (Elliot Stock, 62, Paternoster-row, E.C.) is described as a reference book for engineers and builders, but is intended for beginners. Practical considerations are given precedence over mere theoretical laws, so that by its study a young man may obtain a superficial survey of many branches of his profession. Thus the author, in a book of 160 small octavo pages, treats upon the laying out of railway lines, foundations, beams and girders, and even finds room for a supplementary chapter on land surveying. Numerous diagrams are given.



## THE LATE MR. H. J. PAULL.

WE regret to announce the death of Mr. Henry John Paull, of London and Manchester, the well-known Gothic architect, at the age of 57 years, after an illness extending over sixteen months. Mr. Paull was articulated in 1848 to Messrs. Hamilton and Medland, of Gloucester, and at the termination of articles he acted as clerk of works during the erection of a temperance hall and hotel at Leicester, thereby gaining much valuable practical experience. In 1854 he became chief assistant to the late Mr. Teulon, and in January, 1856, commenced practice on his own account in London, removing in the following November to Cardiff. He entered into numerous competitions, in many of which he was successful, one of the early works being Rawdon Theological College, near Bradford. In 1860 he left Cardiff for Burnley, where he entered into partnership with Mr. Ayliffe. In 1862 he again removed to Manchester, and Mr. Ayliffe having retired, Mr. Paull took as a partner in 1867 Mr. G. T. Robinson, in conjunction with whom a very large number of churches, chapels, schools, and cemetery chapels were carried out. Two of the principal clients of the firm were the late Sir John Crossley, for whom the Crossley Orphanage was built, and the late Mr. Hugh Mason. Other important works of this kind were the Union Bank, Huddersfield; Albion Chapel and Schools and Oxford Works, Ashton-under-Lyne; Congregational Chapels at Stratford-on-Avon, Tenby, and Plymouth (Shewell Memorial). In 1871 Mr. Robinson retired, and was succeeded by Mr. Alfred Bickerdike, and in 1876 the chief offices of the firm were removed to No. 2, Quality-court, Chancery-lane, W.C. One of the principal works of this period was Christ Church, Westminster Bridge-road, erected for the Rev. Newman Hall's congregation; it was illustrated in the BUILDING NEWS for Jan. 1, Feb. 5 and 12, and April 9, 1875. The partnership with Mr. Bickerdike was dissolved in 1877, and two years later Mr. Paull was joined by Mr. A. A. Bonella. Their most recent works include Romsey Abbey Congregational Church (illustrated in the BUILDING NEWS for Nov. 6, 1885), the High School for Boys, Plymouth, the first section of which is now in progress; Islington Congregational Chapel, Baptist Chapels at Woodberry Down, South Norwood, and Highgate—of the latter the schools in the basement are just finished; and the reconstruction of South Lodge, Regent's Park, for Mr. C. J. Waller. Mr. Paull carried out a large number of Nonconformist churches, chapels, and schools, all being in English or French phases of Fourteenth Century Gothic; but in his later works he adopted a Late Tudor treatment for domestic work. An accomplished draughtsman, his chief forte lay, perhaps, in his skilful planning. He had been a member of the R.I.B.A. for the past one-and-twenty years, but rarely took part in its proceedings or in meetings, his affliction of deafness being a disqualification. He married in 1837 the only daughter of the late Mr. James Sargeant, of Leicester, who survives him, and by whom he leaves one son, Mr. Alan Paull, F.S.I.—by whom the practice is continued in conjunction with Mr. Bonella, as Bonella and Paull—and two daughters.

## HUDSON AND KEARNS' DIARIES.

FIFTEEN years have now set their seal on the admirable diaries issued by Messrs. Hudson and Kearns, of Southwark-street, and it is impossible to say more than that they fully maintain their usual standard of excellence and usefulness. The Registered Date Indicating Blotting Pads have become such indispensable office luxuries, that it is only needful to hint that Nos. 7 and 8 are the best, and will be selected by all who value an infallible desk remembrancer. The "Architect's Diary," in its two forms—selling respectively at 4s. 6d. and 5s. 6d.—is, as usual, a diary, index, notebook, and set of office books in one, besides containing the best selection we know of, of all the usual information sought in diaries. The "Builder's Diary," at 4s. 6d., is as good in its way, and the cheap half-crown diary for general use (No. 9) is without a rival. A word of commendation is due to their handy suspensory Calendars, showing three months at a time, and giving the Postal regulations in full on the back,

## Building Intelligence.

ALLOA.—The opening ceremony in connection with the new Town-hall and Library for Alloa, the gift of Mr. Thomson Paton, of Norwood, took place on Friday. The buildings, which are situated at Marshall, are Gothic in style, and are built of sandstone from Polmaise Quarry. The height of the front portion, from the ground-line to the ridge, is 66ft. The central block of the front portion projects 8ft. beyond the general line of frontage. The hall proper is 95ft. by 49ft., and 36ft. in length; it is seated for about 1,000 people. The entrance-hall is carried up through three floors, forming an open well for the staircase, which starts from the ground-floor in two divisions, one on each side of the doorway. The massive pillars which carry the several floors are panelled and moulded on their four faces in glazed Burmantofts faience, and the semicircular archways are also treated in a similar way. The staircase is lighted from the roof by means of an enamelled and painted ceiling light. The whole of the faience work has been modelled from the architect's design, the prevailing colours being delicate greens. On the mezzanine floor are the reading-room and billiard-room, and the librarian's room. On the second floor are situated the science classrooms. Immediately above the reading-room is the elementary science classroom. The library contains over 7,000 volumes. The building, which has been erected from plans by Mr. Waterhouse, R.A., London, has cost between £20,000 and £30,000.

BIRMINGHAM.—The opening of the new Woodhouse Infirmary, illustrated in our pages on the 3rd February of this year, will take place on the 9th January next. The design, selected in open competition, is by Mr. W. H. Ward, of Birmingham, under whose superintendence the work has been carried out at a cost of £60,000. The plan is on the pavilion system—a corridor 10ft. wide running down the centre of the site, with the pavilions right and left for males and females respectively. Each pavilion is three stories in height, and contains on each floor a ward 90ft. by 26ft. At the end of this ward, nearest the corridor, a separation ward, duty-room, linen store, &c., are situated, while at the far end a bathroom and lavatory are arranged in one wing, and the w.c.'s, urinals, and slop-sink in another. Across the end of ward an open verandah is arranged for the use of convalescent patients. The nursing staff when off duty are accommodated in a separate building, each nurse having a separate bedroom; a large recreation hall or library is provided, and also three suites of rooms for the superintendent and assistants in a detached building. The medical staff and superintendent are also housed in a separate building, distinct entrances being provided in addition to the main central entrances. The committee room, with lavatory and cloakroom accommodation, is placed close to the central entrance, and the kitchen and stores department is placed immediately behind the first pavilion. The floors throughout are of concrete and iron, and laid with oak blocks in the wards, and tiles in the corridors, lavatories, &c. Hydraulic lifts are provided in each block. The general contractors are Messrs. Wm. Bissett and Sons, of Sheffield, and the clerk of works Mr. K. J. Osborne.

COSELEY.—On Thursday, the 13th inst., Christ Church, Coseley, which had been closed for several weeks for repairs, was reopened by the Bishop of Lichfield. The centre aisle has been narrowed, and an additional row of pews placed along each side of the church, thus affording additional accommodation for more than a hundred persons. The stone floor of the aisles has been taken up and replaced by wooden blocks. Messrs. Jones and Willis, of Birmingham, have erected a new oak altar, which stands three steps higher than the previous one did. The pulpit has been lowered considerably and the font removed further back. Considerable improvement has been effected in the lighting arrangements. The old heating apparatus has been renewed, and flues placed in the side aisles as well as in the centre. A new clergy vestry has been built over that for the choir, and the space formerly occupied

by the old vestry is converted into a side chapel. The builders are Messrs. H. Dorse and Son, of Cradley Heath, and the architect Mr. W. A. Bonney, of Rugeley. The total cost of the work was £900.

DARTMOUTH.—St. Saviour's Church was reopened on Tuesday week, after having undergone the first section of a restoration, from plans by Mr. Ashworth, of Exeter, carried out by Mr. R. Rundle. The roofs have been entirely reconstructed, the principals being of pine, and the plankings and mouldings of red deal. Ventilation has been provided for by the introduction of Boyle's ventilating shafts and air-pump. The roofing is of Delabole slate, and the gutters have been laid with lead, and new external iron shoots and descending pipes fitted into ornamental cistern heads. The flat ceilings of the chancel aisles have been restored in massive oak. New bosses have been carved by Mr. H. Hems, of Exeter, and the roof of the chancel has been further decorated by gilding the painted bosses. The external walls of the chancel and chancel aisles have been repaired by the removal of decayed stones, and the buttresses recapped with worked Dartmoor granite. New crocketed pinnacles have been placed at each angle of the chancel, with coping and niche in Bath stone. The staircase turrets have been raised, covered with lead, and finished with Bath-stone copings. The vestry has been enlarged. All the windows of the church are entirely new and designed by Mr. Sedding, and are in the Perpendicular style. The north and south chancel windows are of stained glass, the artist being Mr. F. Drake, of the Cathedral Glass Works, Exeter. The stonework is of Doulting stone, from the works of Messrs. Trask and Son, Ilminster, Somerset. The entire floor of the chancel has been taken up, and the sacrarium has been laid with four steps of Hopton Wood stone or Derbyshire marble, the spaces between of coloured Devonshire and Carrara marble. This work has been carried out by Mr. J. Tucker, of Market-street, Torquay. New choir stalls have been fitted, having carved ends and fronts, the flooring being of oak blocks set with asphalt. The crypt under the chancel has been utilised for the reception of the heating apparatus.

DITCHINGHAM.—A new mission-house was opened on Tuesday last at Ditchingham. It consists of a room 50ft. by 18ft., a small residence for the two sisters in charge, and a small oratory. The large room is made with a moveable partition, so as to be easily divided, and the pitch-pine roof has trusses, with cut queen-posts and wave-boards. The whole is brick built, part half-timbered and rough cast, its cost amounting to £1,050. This makes the eighth building erected by the community of All Hallows since they settled in this parish in 1859, when they built the House of Mercy. This was followed by two orphanages, a country hospital, a priests' house, and, since 1876, a community house as a residence; and Holy Cross House—a memorial wing to the late Rev. W. E. Sendamore, from designs and under the superintendence of Mr. Augustus Frere, F.R.I.B.A., of London, the whole of the works having been ably and satisfactorily carried out by Mr. Robert Morris, Ditchingham, Norfolk.

EDINBURGH.—The Tron church has just undergone internal transformation at a cost of £2,000. The whole of the old pews and galleries have been cleared out, and the church has been entirely refitted. The galleries, which were very low, have been considerably heightened. A gallery, or balcony, has been run across the south end of the church, and treated with open balusters in front. In the centre of it is the pulpit, which juts out from the line of the gallery, forming part of an octagon. This projecting portion is carried by a panelled cove, which in its turn is supported by a fluted wooden column. At one end of this pulpit gallery is situated the organist's seat, and the organ above, now introduced for the first time, with its carved case. Below the pulpit gallery are ranged the elders' stalls, and in the centre of these seats is the Communion table. The vestibule and staircase have also been rearranged. The whole of the works have been carried out under the supervision of Mr. R. Rowand Anderson, LL.D. (Messrs. Wardrop and Anderson), of Edinburgh.

FLEET-STREET, E.C.—The Law Courts Branch



of the Bank of England, erected partly on the site of the old Cock Tavern, was opened for business on Friday. The building is Italian in style, and has been erected from designs by Mr. A. W. Blomfield, A.R.A. It has a frontage to Fleet-street of 80ft. in length, with a return frontage in Bell-yard, which has been widened, 50ft. long, thus covering a ground area of 4,000 square feet. It contains three lofty stories, besides a deep basement floor, and is surmounted at the three angles by towers, rising to a height of 70ft. The basement walls are formed of large blocks of Aberdeen and Cornish granite, and are between 3ft. and 4ft. in thickness, rising to a height of from 4ft. to 6ft. above the ground line. The two elevations of the superstructure are faced with Portland stone with Shap and Peterhead polished granite columns. The banking house, with the adjoining offices, occupies the whole of the ground floor, being 70ft. by 40ft. The floor of the public part is laid in mosaics, supplied by Messrs. W. H. Burke and Co., of Newman-street. The upper floors will be occupied as the manager's residence. The strong rooms are in the basement, and are entirely inclosed within walls built of Staffordshire blue brick, consisting of several courses, each course being intersected and bound by strong hoop-iron. The building throughout is fireproof. Messrs. Dove Brothers were the contractors, and Mr. Fisk the clerk of works. Mr. Elsley's apparatus is used for opening the windows, and the sanitary appliances are by Mr. George Jennings, of Lambeth. The erection of the building has involved the outlay of little short of £100,000, the cost of the site having been about £35,000.

**HIGH LITTLETON.**—The rebuilding of the parish church at High Littleton has been completed. The only part of the original structure that remains is the tower at the west end, built in Henry VII.'s reign. The structure that has been removed was rebuilt in 1739 on the site of an ancient church. The present edifice is in the Earliest Perpendicular style, and comprises chancel, nave, side aisles, organ chamber, and vestry, and small chapel on north side of chancel. The restoration has been carried out at a cost of £3,000. Mr. Wilcox, of Belmont, Bath, was the architect; the builder was Mr. Bladwell, of the same city; and the carving was executed by Mr. Henry Ellis, of Entry-hill, Bath.

**LARKHILL, N.B.**—The parish church, which has been enlarged and reconstructed, was reopened last week. Formerly the accommodation was for 600, and with more roomy pews, sittings are now provided for 900 persons. Only the side and front walls, with steeple, remain of the old building. The church is extended in length 19ft., and the new vestry, with heating chamber, has been erected along eastern side. The Late Gothic style has been adopted to assimilate the new with the old work. The interior is entirely new, with gallery round three sides. The chief features of the interior are the form of the ceiling, and the polychromatic treatment of it and the walls. The ceiling over the side galleries is flat and wagon-headed in centre from the beam upwards to ridge, and is plastered between the couples, which are partly exposed and stained—the surfaces being divided into panels and enriched with stencil decoration. The whole works have been carried out from the designs of Mr. James Ritchie, architect, 209, St. Vincent-street, Glasgow. The contractors were:—Mason, Messrs. Boyd, and Co.; wright, John Crow; plaster, John Taylor; slater, Wm. Shearer; painter, Alex. Smith—all of Larkhall; plumber, Lachlan Taylor, Hamilton; glazier, W. Meikle and Son, Glasgow; gasfittings, Buchan and Macintyre, Glasgow; and heating, Boyd and Son, Paisley.

**LIVERPOOL.**—The altars in the sodality chapel in St. Francis Xavier's, Salisbury-street, were unveiled on Sunday at the High Mass. One of the altars, that dedicated to Our Lady, is, together with the reredos, composed of Pavanazzo marble. This altar contains in all 17 figures of various saints, in addition to sculptured figures of Our Lady and Child. The various portraits have been carefully collected from different sources by the Fathers of the society. The back elevation is made of alabaster, and takes the general form and design of the front, but with less elabora-

tion of detail. The other altar, dedicated to St. Joseph, together with the reredos, is composed of alabaster, with two large sculptured groups in white statuary marble. The frontal panel of the altar contains a sculptured group representing the espousal of Mary and Joseph, besides which there are numerous figures. The centre panel, also sculptured in white statuary marble, represents the death of St. Joseph in the arms of Our Lord, and with the Virgin bending over. The upper portion of the altar as yet is not complete, and will remain unfinished until the design for the ceiling of the chapel is carried into actual execution. Both altars are the work of Mr. R. L. Boulton, of Cheltenham, executed from the designs and under the superintendence of Mr. Edmund Kirby, of Liverpool.

**NORTHAMPTON.**—All Saints' Church was reopened on the 13th inst. In the interior the leading features of the church have been preserved. The principal alteration is in the chancel. The east window has been blocked up on the inside, and a new reredos erected. Corinthian columns and pilasters, resting on a double pedestal, have been introduced, and the central compartment, finishing with a semi-circular arch at top, contains a painting of the Crucifixion by Messrs. Heaton, Butler, and Bayne, of London. Mr. Harry Hems, of Exeter, is responsible for the whole of the carving. Formerly the entrance into the chancel was bald and meagre in the extreme. This has been remedied by the introduction of coupled Ionic three-quarter columns, supporting an enriched semi-elliptic arch, with large pilasters facing the nave, corresponding with the stone columns which carry the fine central dome. The chancel possesses an exceedingly rich ceiling of modelled plaster work of the true Wren type, and, to harmonise with this, the walls have been covered with ornamental plaster-work, executed by Messrs. George Jackson and Sons, of London. The whole of the works, costing about £2,500, have been executed from the designs and under the superintendence of Mr. Edmund Law, F.R.I.B.A., of Northampton. The contractors for the interior work were Messrs. Smith Bros., and for the outside restoration Mr. W. Beardsmore.

**PADDINGTON.**—Considerable improvements have been recently made in St. Stephen's Church, Westbourne Park, Paddington, by the removal of the aisle and transept galleries, the result of which has been to exhibit in their proper proportions the nave columns and arches, and also the aisle and transept windows, all of which are filled with stained glass. The scheme met with the general approval of the congregation, and a faculty was readily obtained from the Bishop of London's Court. The works have been carried out under the superintendence of Messrs. Francis, who were the architects of the church when it was built some thirty years ago. It should be mentioned that the alterations comprise a new gallery with arcaded stone front across the tower end of the church, which has been so designed as to add to the effect of the interior. The builders employed were Messrs. Thos. Gregory and Co., of Clapham Junction.

**SALTASH.**—St. Barnabas Cottage Hospital, built at the cost of Mrs. Ley, was opened on Tuesday. The building is of red brick, hung with half-timbered oak-work with panels of stucco, a conspicuous feature being the circular east end of chapel. On the left of the entrance lobby is a waiting room for visitors, and on the right is the operation room, the surgery, and a bathroom. The men's wards are two in number, each of four beds, and occupy nearly the whole of the south side of the ground floor, the sisters' room being placed between. On the first floor are a dining-room with open-timbered roof, for convalescent patients, with a balcony outside facing south, and the nurses' day-room. On the same floor are the two female wards, one for four the other for two beds; between them is the nurses' bedroom, which has a balcony outside. On the second floor is the children's ward, with accommodation for four beds. The chapel is apsidal in form, and the interior is of red Berkshire brick, relieved by stone dressings and labels, the arches over the windows being of rubbed gauged brick work. The roof is barrel-vaulted. Seating accommodation will be provided for 24 persons. At one end of the chapel is a small gallery on a level with the

first floor, intended for the use of patients in the upper wards. Near the organ recess has been hung the dedication picture, depicting St. Barnabas, painted by Mr. E. Fellows Pryne. On the basement are a heating chamber, kitchens, scullery, ice-house, laundry, and mortuary. The whole building is heated by hot-water pipes, supplied by Bennett Brothers, Liverpool, and the wards are fitted with pneumatic bells. There is also a lift communicating with the upper landing. The work has been carried out by Mr. R. W. Rowse, builder, of Mutley, from the designs of Mr. George H. Fellows Pryne, of London and Plymouth. Inclusive of site, the cost has been £4,500.

#### CHIPS.

A latten brass to the memory of the late rector, the Rev. Prebendary Mackenzie, has been placed on the walls of All Hallows' Church, Lombard-street, E.C. It was manufactured by Mr. Gawthrop, of Long-acre.

A church for members of the Established Church is about to be erected at Strathpeffer. Plans have been prepared by Mr. Jones, architect, of a building accommodating 600 persons, and these have been adopted. The church will cost upwards of £2,500.

The historic ruins of the Cistercian Abbey of Kirkstall, near Leeds, which were offered for sale at the Cardigan estates sale, were sold by private arrangement on Friday to a number of gentlemen of Leeds for the sum of £10,000, and the Abbey House for £3,500. The ruins, which are inclosed in twelve acres of land, will be retained for the use of the public.

The most extensive railway scheme for next session is that of the West Highland Railway Company, which will be 130 miles in length, and forms a direct connection between Helensburgh and Fort William, with a spur line to a proposed harbour and pier at Roshven in Moidart.

A marble bust of the late Bishop Wordsworth has been placed in the Bishop's Hostel, Lincoln.

The old "Crown and Dove" and three other old buildings in Bridewell-street, Bristol, have recently been demolished, and replaced by a new licensed house built by Messrs. Brook and Son, from designs prepared by Mr. W. B. Gingell. The new premises have a frontage of 60ft., are three stories in height, and are faced with brick and freestone dressings. Mr. Palmer was the clerk of works.

A Roman Catholic Church, to be dedicated to SS. Peter and Paul, is being built near the village green at Mithcam, as a memorial of the Pope's Jubilee. The architect is Mr. Frederick Walters.

The Victoria Jubilee Hall at Ealing, opened by the Prince and Princess of Wales on Saturday, forms part of a block of buildings erected concurrently with it by the local board. The architect is Mr. Charles Jones, surveyor to the Ealing local board.

A new boardroom and other additions have just been completed at the Southampton workhouse at a cost of £1,200. Mr. W. H. Mitchell, of Southampton, was the architect, and Mr. J. W. Rowland, of the same town, the builder.

The First Division of the Scottish Court of Session, adhering to a judgment of Lord Lee, decided on Friday that a firm of builders in Glasgow (Messrs. Morrison and Mason) were not entitled, under a policy of insurance with a company insuring employers against liability for accident, to relief from damages and costs obtained by a workman, on the ground that the policy did not cover an action at common law, which the workman's action admittedly was, but only actions arising under the Employers' Liability Act. The Court consisted of the Lord President and Lords Muir, Shand, and Adams.

A lecture on "English Church Architecture" was delivered before the members of the Bournemouth Field Club at their last meeting by the Rev. G. H. West, M.A.

The Roman Catholic Church of St. Mary, Harington, has just been reopened after being decorated and improved, from designs by Mr. R. J. Hopkins, of Abergavenny. A new wrought-iron chancel screen and the heating apparatus are the work of Messrs. R. J. Harris and Son, of Rugeley.

A cottage hospital was opened on Friday at Carnarvon. The premises, which are situated in Segontium-terrace and Gamina-street, were lately held by the Carnarvonshire Reform Club. The alterations were carried out by Mr. Edward Parry, contractor, Carnarvon, from the designs of Mr. R. J. Davics. It consists of a ward for men, with accommodation for six beds; two wards for females, capable of accommodating three beds each; an operating room, lavatory, and other rooms.



## COMPETITIONS.

**THE SOCIETY OF ARCHITECTS.**—The Council of the Society of Architects notify that Mr. Walter Emden has offered a prize of £10 for the best paper upon some constructional subjects, to be competed for by members of the architectural profession only. The subject selected is "Constructional Ironwork." Papers should contain not less than 3,000 nor more than 6,000 words each. Papers may be illustrated, if the authors think fit, by not more than five clearly-drawn ink sketches upon paper of the exact size of 20in. by 10in. All papers must reach the secretaries of the Society of Architects, St. James's Hall, Piccadilly, London, W., not later than 4 p.m. on Thursday, February 28th, 1889, carriage prepaid, registered, and endorsed "Competition for Mr. Emden's Prize." The gentleman to whom the premium is awarded must be prepared to read his paper before the society upon Tuesday, April 9th, 1889.

## ARCHITECTURAL &amp; ARCHÆOLOGICAL SOCIETIES.

**ARCHITECTURAL ASSOCIATION.**—The fortnightly meeting of the Architectural Association was held on Friday evening; the President, Mr. H. D. Appleton, in the chair. The following seven new members were elected:—A. Campbell, A. G. Wyand, D. M. Litster, J. K. Hunter, J. C. Jackson, G. A. Luten, and A. W. Cooke. The President then announced that Mr. Arthur Cates had offered a Travelling Studentship of £15 to enable a young architect to go to Paris next summer and study the International Exhibition that would then be open, particularly the construction of the buildings and the examples of manufacture and architecture therein collected. The offer was received with hearty thanks. A lecture on "Symbolism," illustrated by drawings, was read by Mr. William Doubleday, of Birmingham. The author showed that most of our Christian symbols, notably the cross, were derived from older sources, and argued that if we were in possession of the intermediate links we should find that our symbols could be traced back, like the alphabet and all conventional signs, to the attempts at picture-language made by the earliest races inhabiting the earth. The address was illustrated by many quotations from the poets, including Longfellow and Walt Whitman. At its close a short discussion took place, in which Messrs. Hugh Stannus, A. C. Bulmer Booth, J. P. Oliver, and W. Randolph joined, and a vote of thanks was passed to Mr. Doubleday.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—At a meeting of the Glasgow Architectural Association held on Tuesday night, Mr. R. C. Grant read a paper on "Joinery." The first annual report was subsequently read by Mr. J. B. Douglas, the hon. secretary. After recapitulating the causes which led to the formation of the association, it was stated that the membership now numbered 214. The office-bearers were afterwards re-elected.

**MANCHESTER ARCHITECTURAL ASSOCIATION.**—At the fourth ordinary meeting, held on Tuesday at the Diocesan Buildings, Mr. A. H. Davies-Colley, A.R.I.B.A., the president, in the chair, a discussion was opened by Mr. H. B. Barr, F.R.I.B.A., upon "Architects and Handicraftsmen." The foundation of a chair of architecture and the allied arts, such as sculpture and decorative painting, was suggested as very desirable at Owens College, Manchester, and other colleges of the Victoria University. The professor would direct a course of manual art work for those who afterwards might adopt any of the special branches of artistic professions or handicrafts. The result would be a sounder and wider education in art, and a greater sympathy between all professions and all handicrafts, which must before long improve art of every kind.

The new Lyric Theatre in Shaftesbury-avenue, built from Mr. Phipps's designs, was opened on Monday.

At the last meeting of the City Corporation a letter was read from the solicitors to the late Mr. William Dunnett, announcing a bequest to the Corporation of his pictures, statues, marbles, bas-reliefs, and other works of art. It was stated that the works of art numbered about a hundred.

## SCHOOLS OF ART.

**METROPOLITAN DRAWING CLASSES.**—Viscount Cross presented, on Wednesday evening, the Queen's prizes and certificates to the successful students in these classes, conducted by Mr. W. Busbridge. He urged the importance of technical education, which he regarded as of vital interest to the nation. Mr. Busbridge, in presenting the report, said the Metropolitan Drawing Classes were established in 1867, and since then about 14,000 students had passed through the various classes. Last year, in practical, plane, and solid geometry, 159 passed, of whom three were first-class advanced with Queen's prize, 17 second-class advanced, and 41 first-class certificates with prize in the elementary stage. In the machine construction and drawing there were 87 passed, of whom four were first-class advanced with Queen's prizes. Of the building construction classes, which had in past years usually taken one-fifth of the prizes awarded to the whole of the United Kingdom, 297 passed, of whom 11 were first-class in the advanced state with Queen's prizes, 72 second-class advanced certificates, and 74 passed first-class in the elementary stage with prizes. With respect to the examinations of the City and Guild Institute of London five students passed first-class honours, and one second-class honours, three passed first-class honours grade, one taking first place in masonry and brickwork with silver medal, one second place with bronze medal, and one fifth place with bronze medal. Several students passed second-class ordinary grade. The following took the Queen's prizes for building construction:—W. Garrett, Stockwell; A. Hall, Paddington; W. Humphries, W. Hyde, Vauxhall; T. Lynes, Lambeth; J. Munroe, Vauxhall; W. Perkins and S. Scott, Bayswater; A. Webber, Lambeth; W. Hood and W. Woodward, Vauxhall.

**WEST LONDON SCHOOL OF ART.**—The annual distribution of prizes took place on Friday, the 14th inst., at the school in Great Titchfield-street. Mr. G. A. Thrupp, the chairman of the committee, presided, supported by Mr. Seymour Lucas, A.R.A., and Mr. G. A. Storey, A.R.A. In distributing the prizes, Mr. Seymour Lucas highly commended the work of the students, which, he said, was of much greater merit than that usually done at such schools, and he also bore eloquent testimony to the ability, earnestness, and experience of Mr. John Parker, the new head master, as a teacher. Mr. Storey read an interesting paper on "Meisner," describing his close and persistent study of nature, evidences of which were to be traced in all his works. Mr. John Parker, R.W.S., has recently been engaged by the committee as head master, and other changes have been made in the teaching staff which cannot fail to increase the future efficiency of the school. The "Mence-Smith" travelling studentship of the value of £50 (given by a member of the Painters' Stainers Company, and open to all the schools of art in London), was gained by Mr. James West, while the prize annually given by Messrs. Wm. Woollams and Co., for the "best design for a wall-paper," fell to the lot of a lady—Miss Amy Woodall. Separate life classes have now been arranged for male and female students, and a special class for flower-painting from nature has been established, under the direction of Miss Louisa Aumonier, a frequent exhibitor at the Institute and other galleries; while the class for design is efficiently conducted by Mr. M. Coulson. The school is within five minutes' walk of Portland-road station.

At a meeting of the Linark District Lunacy Board, held in the County Buildings, Hamilton, on Friday, approval was given to the purchase, at £12,000, of the estate at Hartwood, Legno, and New Mill, in the parish of Shotts, for the site of an asylum, and Mr. J. L. Murray, architect, was appointed to prepare sketch plans of the proposed new asylum to accommodate 300 patients. It will be remembered that a number of years ago the old Glasgow District Lunacy Board purchased, at nearly £28,000, the same estate as a site for a gigantic asylum for Glasgow and Lanarkshire, and that the project was overturned by the agitation which resulted in the division of the county into three separate districts.

The Society of Medallists have decided to offer in competition during 1889 two prizes, of the value of £25 and £10 respectively, for medals or models of medals executed either in bronze or plaster.

## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 33, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

## NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII, XLVI, XLIX, L, LI, LII, LIII, and LIV may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

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## "BUILDING NEWS" DESIGNING CLUB.

A. E. FLETCHER, "COSMOS," AND OTHERS. (The three selected designs for a Country Police Station will be illustrated next Friday with a review of the whole of the plans sent in.)—T. M. BRIDGLINGTON. (Thanks for suggestions, which are duly noted. See back volumes for work of our club during previous years.)—Drawings by "Perpendicular" and "Midland" received.

## Correspondence.

## THE ARTS AND CRAFTS.

To the Editor of the BUILDING NEWS.

SIR,—In the report of the discussion which followed the reading of Mr. Woodward's paper on "The Arts and Crafts" before the Society of Architects, and appears on p. 793 of your last issue, I find that my observations have been misunderstood, owing to the use of the titles "sculptor" and "painter" in their generic sense, and not, as your reporter suggests, as applying to "artisans." I purposely avoided the use of the title "artist," as some members of the architectural profession in England repudiate it.

The Ecole des Beaux Arts in Paris is divided into three sections—viz., architecture, sculpture, painting, as is the Royal Academy School in London.

The *Concours simultané*, to which I referred, is a competition in which designs are invited from students of the three sections alike. The subject given is one which offers a field for the employment of the united arts. Thus, a recent programme comprised a design for a shrine or tabernacle dedicated to St. Hubert, to be erected in a forest at the fork of two roads, and to contain a representation of some incident in the life of the saint. The competition is a double one; the first stage consisting of sketches, the sculptors submitting a model in clay, the architects and painters a design on paper.



In the second stage the sculptors work on paper, whilst the architects and painters elaborate their design in clay.

It is necessary to bear in mind that before entering the schools all students, whether architects, painters, or sculptors, must pass an examination, for which a general acquaintance with the history and art of architecture is required, so that all the students have more or less familiarity with the restraints imposed on the decorator.—I am, &c.

FRANCIS HOOPER.

10, Craig's-court, Dec. 15.

#### DISTRICT SURVEYOR'S ASSISTANT.

SIR,—As a district surveyor's assistant, it has occurred to me that there is a want amongst all similarly engaged of exchanging or communicating opinions and experiences relative to our particular duties, which we have at present no means of doing, and which I think would be beneficial to us in extending our knowledge on such matters as the Building Acts, and such peculiar points in both the foundations and construction of buildings which are more frequently met with in district surveyor's offices, as well as matters concerning the shoring and rebuilding of dangerous and ruinous structures.

I have spoken to the few assistants I know personally on the subject of forming a small society with the above objects in view, and they heartily concur with the idea, and would be willing to do their best to render it a success, if it would receive the co-operation of all district surveyor's assistants.

I shall esteem it a favour if you will afford me space in your valuable paper to elicit opinions on the matter.—I am, &c.,

A. W. OSBORN.

27, Ronald's-road, Highbury, N., Dec. 18.

#### OMISSIONS IN CONTRACTS.

SIR,—The leading article in your issue of the 14th upon this subject will do good service if it results in a reform of the manner in which specifications and building contracts are drawn up. Frequently contracts contain provisions which are so one-sided that they would ruin any contractor if they were enforced. These contracts are signed in the belief that they contain such unreasonable provisions that they never will be enforced, and in the great majority of cases this is so. A conscientious architect hesitates to inflict ruin upon a man because he has not fulfilled some condition which he knows to be utterly unreasonable. The consequence is that the very stringency of the contract defeats its purpose.

Very strong remarks have before now been made from the Bench upon the folly of contractors who will sign such conditions as I have indicated. The excuse is that everyone does it, and the strict letter of the contract is never meant to be enforced. This is a doctrine which is demoralising to everyone concerned. It would be far better to agree to fair conditions which would be strictly carried out.

I believe that in some parts of the United States a general form of contract has been agreed to by representative architects and contractors. Why could not some such plan be adopted in this country?

No doubt, special cases would require special provisions; but a great deal would be done if a form of contract could be settled which would be applicable generally. A standard rule could then be adopted in respect of payment for omissions from quantities or specifications. If some such arrangement as this could be carried out, and the best architects and best contractors adhered to it, the trouble would disappear. Under the present system, everybody seems to be anxious to get the better of somebody else.—I am, &c.,

Bristol, Dec. 11th.

ARTHUR LEE.

#### MORE COMPETITION PLUMS.

SIR,—Kindly keep your readers informed as to the competitions at Filey, Yorkshire, and at Walton-on-the-Naze. At both these places £20 is waiting to be picked up by some lucky engineer. At Filey, plans, sections, estimates, and details for the construction of sea defences are required; but that is not much for the money. At Walton an engineer is wanted who is willing to state his age and experience. If

these are both satisfactory, he will be at once placed on the list of competitors for preparing plans, sections, and estimates for a sea-wall, and also for a groyne, and for this the sum of £20 will be given to the happy fellow who is successful!

There are two slight drawbacks. The Filey prize-winner must give his time and labour, and surrender his plans without the least hope of carrying out the job; and at Walton the £20 prize is distinctly to cover all charges and expenses.

I do trust, Sir, you will be able to procure a list of all the competitors, so that the members of our profession may see who will respond to such mean—may I say, disgraceful?—competitions.—I am, &c.,

E. E.

#### DISCONNECTING WATER-CLOSETS.

SIR,—Evidently your correspondent (Mr. Alfred S. Goodridge) adapts the "pros" and "cons," he gives on the above subject to suit his own taste. If, as Mr. Goodridge remarks, he has, "after some observation and experiment," found that "the cutting off, by a water-trap, each closet from the house-drain, diminishes the possibility of communication of poisonous gases and germs," surely he will not advocate an opposed system, based merely on the weak arguments of his "cons."

I will refer briefly to the so-called disadvantages of the water-closet traps, taking them in the order given by your correspondent.

1. The remedy suggested against the evil advanced is self-convicting. The fact that it is not usual to carry out this suggested remedy does not prove the faulty principle of the trapped water-closet. In the case of a trapless closet, the length of the branch-pipe between the closet and the soil-pipe is not materially diminished, and assuming, in the former case, that this branch-pipe is a receptacle for stagnant air, in the latter case an open end into a house would most certainly release this confined air in a direction to be avoided.

2. This is contradictory to the statement contained in the first paragraph in favour of the trap. The water-seal of a closet is never under pressure in a properly-devised system.

3 and 4. It is seldom practicable to make the soil-pipe a down-cast shaft for fresh air, owing to the height the up-cast shaft would have to be carried to produce a current by the difference in barometrical pressure. Mechanical appliances to produce a current should be avoided, as they act only under favourable conditions. The high temperature inside a dwelling-house occasionally induces a current in that direction, and it is in this departure from the theory of the ventilating system that the water-closet trap overcomes.

Unfortunately, the requisite stacks of pipes for thorough ventilation are frequently dispensed with, on the plea that they are unsightly. This, however, does not affect the question raised as to disconnecting closets.

6. The difference in cost of the two systems is so insignificant that it is scarcely necessary to allude to it, and it depends entirely on the circumstances of each case, which system is the cheaper. Life and health should not be sacrificed for pecuniary considerations.

7. The head of water is not diminished to any perceptible degree by the insertion of the trap under the closet; consequently, the flushing power remains the same in one case as the other.

8. The answer given to 3 and 4 applies also to this. Owing to variation of temperature and other causes, the course of the air-current cannot in practice be depended upon, and if no trap is placed underneath the closet, the air is as likely to be induced into the house as not when the valve is open.

The first argument Mr. Goodridge adduces in favour of the trapped closet is ample to peremptorily dispense with the long string of "cons."—I am, &c.,

Dec. 17.

JOS. S. PICKERING.

SIR,—I have read the interesting letter on p. 796 from Mr. A. S. Goodridge, and it appears to me that Mr. Goodridge does not fairly state the "pros" and "cons."

It would be interesting to see some illustrations in support of the statements made—a

small plan showing each method, with an elevation showing how Mr. Goodridge would arrange piping to give a down-cast of air in the soil-pipe, with a clean up-cast pipe for ventilation, as described under the "cons."

I have always understood that it was the disconnection of each stack of soil-pipe from its branch drain that has been advocated in your columns, and not the disconnection of each water-closet. It would be interesting to see notes of Mr. Goodridge's experiments printed in your columns, and if Mr. Goodridge will favour your readers with three small illustrations clearly showing what he means, this important matter can be discussed.—I am, &c.,

CLERK OF WORKS.

## Intercommunication.

### QUESTIONS.

[9867].—**Artificial Stone.**—Could any reader inform me of any liquids with binding properties that I could use as a mixture on a bath for hardening and combining loose sharp sand, excepting cement or oil, that the weather would not affect?—ARTIFICIAL STONE.

[9868].—**Municipal Buildings.**—I should be glad to know of any book that treats of the correct planning of municipal buildings, &c., or if the names of towns could be given where municipal buildings have been erected that are considered models.—IGNORANT.

[9869].—**Valuations.**—Could any reader tell me how to value house property? The houses are of stone, brick, and brick-faced with cement. Some of the houses are new, and some have been built for some years. Are there any books published for making such valuations?—SCOTTIE.

[9870].—**Dovetails attached to Churches.**—I have found what I believe to be a Medieval dovetail, built into walls of 13th century, at the west end of north aisle. Will any reader kindly give me an account of others that may be found, and their purpose in this situation, and oblige?—SUBSCRIBER.

[9871].—**Section of Inclined Girder.**—Would some kind reader say whether in designing a girder to be secured at both ends, with one end much higher than the other, it is right in calculating for the depth to measure it at right angles to the inclined girder or to measure it vertically? I know that the span should be measured between the effective bearings, but am not sure as to section.—ANXIOUS.

### REPLIES.

[9837].—**What is a Billion?**—Both sets of your correspondents who answer this question are right in a sense, although they differ as to the number of ciphers to follow the unit 1. If the expression be in figures, no difference can arise as to meaning. But if words be used, a billion in English is a million millions, expressed by 1 and twelve ciphers (1,000,000,000,000); whilst the French "billion," or milliard, only the thousandth part of the English billion—viz., one thousand millions, expressed by one and nine ciphers (1,000,000,000).—A. HARSTON.

[9840].—**Appraiser's License.**—This question crops up periodically with great regularity from a series of "Old Subscribers" and "Constant Readers," the latter of whom do not appear to benefit from their constant reading or they would have seen the many previous answers which may now be found by consulting the index columns of the BUILDING NEWS. To answer once again, here is question put to the authorities at Somerset House in the year 1871, and their reply:—Question: "The New Stamp Act exempts appraisements or valuations made for, and for the information of, one party only, and not in any manner obligatory as between parties, either by agreement or operation of law. Is it necessary for an architect to take out an appraiser's license for the purpose of enabling him legally to make such appraisements or valuations as are so exempted from Stamp Duty?" Answer: "No license is required to enable an architect to make valuations in either of the cases stated by you." It may be true, as one of your correspondents suggests, that a person holding himself out as an "appraiser" may be liable to a penalty for doing so without holding a license, even though he had in fact made no valuation or appraisement. So would an auctioneer acting in a similar manner, though he had held no auction. But a person who makes valuations which are not in any manner obligatory as between parties, does not thereby hold himself out as an "appraiser," who is one who makes valuations by authority or appointment, which are obligatory as between parties. An auctioneer's license covers him as an appraiser.—A. AND C. HARSTON.

[9852].—**Pressure.**—The pressure on the sides and ends of a cast-iron reservoir or tank does not depend on the area, only on its depth. The pressure increases with the depth, and acts at right angles to the surface. Thus if A denotes the area pressed and H the depth of centre of gravity of A below the surface of water, the pressure is found to be equal to the weight of a column of water whose base is A and whose height is H. In other words, if the tank is 30 x 30 x 15ft. deep, the pressure on one side is 15 x 30 x 1,000z. by depth of centre of gravity, say, 8ft., which will equal weight of column, and therefore pressure on that side. The centre of pressure will act at a point two-thirds from the surface. "M." will find the pressure on water mains for different heads of water in any work on hydraulic engineering.—G. H. G.

[9858].—**Building and Adjoining Owner.**—It is customary to send a written notice to adjoining owner informing him of your intention. In the Metropolis a building owner can enter on any premises for the purpose of executing any work he has power to execute, or his agent or workmen can enter at all usual hours for work-



ing, a penalty being incurred by the adjoining owner for any obstruction or hindrance he may offer. (Section 86.) At the same time, the adjoining owner may require the building owner to give such security as may be agreed upon between them. (See section following.)—G. H. G.

[1881].—**Contractor's Law.**—An agreement may be short or long, but if it refers to the drawings and specification, and those documents are signed, how can the contractor object? In one case I had the tender stamped, and the drawings and specification signed by the contractor. The matter ended in a lawsuit, and the decision was that the contract was valid. It is always difficult to decide such cases without seeing the documents.—H. L.

[1885].—**What is a Three-Storey House?**—1. A three-storey house may contain basement, ground floor, and first floor, or ground floor, first floor, and second floor. A story is the space between the floor and ceiling, no matter where it is situated. 2. If an attic is formed in the roof of a house which already consists of ground floor and first floor, the structure will become a three-storey house.—H. LOVEGROVE.

[1885].—**What is a Three-Storey House?**—If "C. W. G." will refer to the Interpretation Clause of the Model By-Laws issued by the Local Government Board he will find as follows:—"Topmost story means the uppermost story in a building, whether constructed wholly or partly in the roof or not, and whether used or constructed or adapted for human habitation or not."—H. S. C.

[1886].—**Hot Water Apparatus.**—The height of tank above the coil is a matter of little importance. "Truro" must provide for expansion, and he should place the ball-cock near the bottom of the feeding-tank, and support the ball-lever from the top of tank, to resist the upward pressure caused by expanding water. The depth of cold water in the bottom of tank should only be deep enough to flood the ball, and the space above the water and below the overflow in tank should be, at least, large enough to contain 1-12th the quantity of water in the heating apparatus. When the water is warmed and boils it expands and will fill up the tank.—CLERK OF WORKS.

## CHIPS.

The foundation-stone of a Salvation Army barracks was laid in Brook-street, Burton-on-Trent, on Saturday. The plans have been prepared by Mr. J. W. Dunford, of Leytonstone; and the builder is Mr. Coxhead, of the same place, assisted in the stonework by Mr. R. Kershaw, of Burton. The building will be 82ft. long by 44ft. wide, and, including a gallery at one end, will provide room for about 1,200 people. The cost will be about £1,700.

A stained window to the memory of Captain Reynolds, of Warrington, has been placed by his widow in Grappenhall church. The window is in the centre of the north aisle, and has been designed and constructed by Messrs. Shrigley and Hunt, of Lancaster and London. The subject depicted is the Vision of St. John.

New mercantile marine offices near the Morpeth Dock, Birkenhead, were opened on Friday. They have been erected from the plans and under the supervision of Mr. T. Myddelton Shalleress, of Liverpool. The external walls are faced with Edwards's Ruabon pressed red bricks, the moulded plinths, bands, sills, jambs, and special features being of Edwards's red terracotta. The roofs are covered with small-sized Westmoreland green slates. Internally the walls are faced for a height of 4ft. with glazed tiles, the remainder being finished off in plaster. The floor of the waiting-room is laid with small red tiles, the remaining floors being laid with pitch-pine wood block-paving. Messrs. Morrison and Sons, of Waverley, were the sole contractors.

The winter exhibition at Burlington House will consist of a gathering of the portraiture and pathetic *genre* subjects executed by the late Frank Holl, supplemented by a collection of the canvases of Rembrandt, Antoine Watteau, and his follower, Nicholas Lancret.

A stained-glass window in memory of the late Archbishop Strain was unveiled in the Roman Catholic Chapel, South Queensferry, on Saturday. The work has been executed by Messrs. Barnett and Son, of Leith.

At a meeting of the Architectural Section of the Glasgow Philosophical Society held on Monday night, Mr. James Chalmers, architect, read a paper on "Some Considerations Affecting Unremunerative Property in Glasgow."

The erection of the Leopold Institute at Slough, Bucks, is about to be commenced, the tender of Mr. T. Martin, of Maidenhead, having been accepted for the work at £4,655. The architect is Mr. H. A. Cheers, of Twickenham.

The Bath city council adopted on Tuesday a report by the Surveying Committee, recommending that Mr. Fortune (the present assistant surveyor) be appointed surveyor, and Mr. Parfitt, the surveyor, consulting surveyor. Mr. Parfitt has been practically superannuated for some time, and the change was recommended owing to the legal decision in the recent case from Weston-super-Mare that certain acts of a temporary or acting surveyor were not valid.

## Our Office Table.

PUBLISHERS of manuals and school textbooks have been busy bringing out treatises on building construction. During the last week or two we have had no fewer than half a dozen manuals on the subject by lecturers on building construction in our large technical schools of London and the provinces. We refrain from "odious" comparisons; the authors seem to have all been seized with the *cacoëthes scribendi*, and to have rushed into print under the belief that construction is an untrodden ground, possibly in view also of the May examinations of the Science and Art Department. We do not deny that the older textbooks were either too expensive for students of this class, or imperfect. Building construction has of late years taken a distinct and prominent place in school literature, and has almost assumed the scientific precision and classification of a science.

MR. RICHARD REDGRAVE, R.A. (retired), C.B., died on Friday at his residence, Hyde Park-gate, at the age of 84 years. During his early youth, his father, William Redgrave, being with Bramah, the inventor of the hydraulic press, Richard was employed in designing and in the drawing of specification work, and this employment acted upon his whole life. He had long supplemented his business work with sketching from nature, and when he, at the age of 21, entered the Royal Academy as a student, he supported himself by giving instruction in landscape drawing. About the year 1836 he exhibited his first well-known work, "Gulliver on the Farmer's Table," at the British Institution. It was not till 1838 that a picture of his was hung on the line at the Academy, but from this time his success was assured. In 1840 he was elected an Associate of the Academy, and eleven years later he produced his "Flight into Egypt." About this time, with the help of Mr. (afterwards Sir Henry) Cole, he formed the museum of ornamental art at Marlborough House, the nucleus of the present Museum of Art at South Kensington. At the Great Exhibition in 1851, Cole was one of the executive committee, while Redgrave was one of the jurors in the fine art section, and he further wrote a report on design applied to manufacture as shown in the exhibition. In 1855 the two represented Great Britain at the Paris Universal Exhibition. Cole was British Commissioner; to Redgrave were intrusted the arrangements of the British Art Section, and here he drew up a report similar to the former one. In 1858 the Queen appointed Mr. Redgrave Surveyor of Crown Pictures, and for many years he was engaged in preparing a catalogue of all pictures belonging to the Crown. In 1866 he joined his brother Samuel (who died in 1876) in preparing a history of British art from the time of Hogarth, under the title of "A Century of Painters." For many years he kept up his connection with South Kensington, where he took the chief part in forming an historical collection of water-colours for the Museum. In 1880 he resigned both his appointment as Surveyor and Keeper of the Royal Pictures, and also his post in the Department of Science and Art at South Kensington, and from that time he seems to have painted but little. Until 1878 he had constantly contributed to the exhibition at the Royal Academy. His son is Mr. Gilbert R. Redgrave, inspector of local schools of art.

AN "Accident-prevention fitting" readily applicable to existing window-sashes has just been invented and patented by Mr. William Youten, M.S.A., of 37, Great James-street, Bedford-row. The sashes slide up and down in the usual manner, but the lower half of the inside beading on either hand can be turned back on a hinge; the lower sash is then supported at its upper or meeting rail by a hinge arrangement of pins, and can be steadied at an angle of 45° upon a stay bar, and thus easily cleaned. In like manner the lower sash being shut up in the ordinary way, the upper sash can be lowered, and similarly hinged and supported while being cleaned, removing all risk and much trouble to the servant during that operation. The fitting can be applied to existing sashes as readily as to new ones, there being

no difference in construction or joinery work from ordinary frames. As tested by us in a model the fitting appears simple, and not easily put out of order. It has been adopted by Mr. E. R. Robson, F.S.A., for the Queen Anne's Mansions, both for the present block and the extension now in progress.

THE Committee on the Metric System appointed by the Western Association of Architects held lately at Chicago, have taken some trouble in finding out the opinions of members. The Boston Society of Civil Engineers instituted a number of questions, to which replies have been sent, but from only 42 per cent. of the members. One of the questions was Whether the uniform system of the United States ought to be as exclusively decimal in its ratios between units and the same class as United States money is now? The affirmative answers were 73, negative 8; the percentage of affirmative answers to the total number being 90. These replies are a sample of the others, and lead only to one conclusion, that the metric system must sooner or later be adopted. In Germany, according to Dr. Adlee, who has made inquiries as to the difficulties attending the introduction of the system in that country, the answers received from architects, engineers, manufacturers, and others were in favour of the metric system. Very few errors were made in the earlier days of its use, and even those who had grown grey in the use of the old system had experienced little trouble in adapting themselves to the new weights and measures.

## STATUES, MEMORIALS, &c.

KENSINGTON.—The Kensington memorial to the Queen, in commemoration of the 50th year of her reign, takes the form of a marble statue, to be executed by the Princess Louise. A sketch model of the statue has been shown to the committee for the memorial, and accepted. It represents the Queen as a young girl as at the time of her accession, and is founded on the well-known contemporary picture by Sir George Hayter. The site decided on is the east front of Kensington Palace, looking over the Round Pond and the avenue of trees eastward.

## LEGAL INTELLIGENCE.

IN RE E. C. HOWELL.—(London Bankruptcy Court, before Mr. Registrar Giffard, Dec. 19.)—His Honour made a receiving order under a petition presented by the debtor, who is described as of Crozier-street, Lambeth; Woodford, Essex; and Bristol, builder and contractor. No statement of affairs has yet been filed, but the liabilities are estimated at about £20,000, with assets about £8,000. It is stated that among the contracts which the debtor has on hand one is for building the County Lunatic Asylum, Woodford.

## STAINED GLASS.

ST. MARGARET'S WESTMINSTER.—The memorial window for Admiral Blake, which has been subscribed for in answer to an appeal by Archdeacon Farrar, was unveiled on Tuesday by Lord Charles Beresford, M.P., in St. Margaret's, Westminster. The window is in the north aisle, and has been designed by Mr. Frampton. It is in three lights, each containing two panels. In the first light the larger represents the Archangel Michael; in the middle St. Peter, walking upon the sea, clasps the hand of Christ; and in the third is depicted the Angel of the Sea. The smaller panels are taken from events in history connected with Admiral Blake. The first shows him at Malaga, rebuking a priest for ill-treating some of his sailors; in the second is seen his coffin borne down the Thames on a draped barge, near Whitehall-stairs; and in the third a band of Puritans are shown reintering his body in St. Margaret's churchyard, after it had been cast out of Westminster Abbey.

The governors of the Royal Infirmary at Aberdeen have finally adopted plans by Messrs. Smith and Kelly for the Jubilee extension of the infirmary buildings.

The Prince of Orange Bicentenary Committee met at Torquay on Tuesday, and decided to accept the design of W. and T. Wills, of London, for the proposed statue to the Prince. The statue will be executed in bronze, at a cost of £700, and it will be completed by August next year. Mr. Harry Hems's design was placed second, Messrs. Wills' being chosen by six votes against five for that of Mr. Hems.



# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LV.—No. 1773.

FRIDAY, DECEMBER 28, 1888.

## SPECIALITIES ACCESSORY TO ARCHITECTURE.

IN these days architecture is very much the product of specialities of manufacture. From the iron girders and rolled joists, which constitute part of the structural skeleton, to the floors, ceilings, and wall linings which clothe it and impart to the whole a decorative finish, the modern building is a combination of manufactures and fittings which form special industries. At one time the crafts employed on the building contributed each their part towards the gross result. Designed with particular application to the structure, the girders were framed to their work with the material at hand; the decorations were such as the modeller, carver, plasterer, or joiner could carry out single-handed. While at one time scarcely half a dozen things were manufactured outside the works or building, now every part of the structure is provided for. The result of this specialisation as regards the mechanical requirements of building has been a gain in many respects. Experience and skilled labour have been concentrated on particular things by the aid of capital; we have truer and better made bricks and tiles, iron goods that are all but perfect in accuracy of make, economy of material and finish, fittings and appliances that exhibit inventive genius and scientific knowledge, besides numerous products which are employed in decoration, and were unknown to our forefathers. Several modes of wall decoration are of this kind, including the Lincrusta Walton, the parquet veneer, fibrous plaster, and wood and leather fabrics. The architect works under a great disadvantage if he is not well acquainted with these inventions, which increase in number yearly, and if he does not know how to apply them to the best advantage. To do so he needs to be informed of the natural properties of the materials used, their durability, and manufacture. How many architects have mastered these things? There are hundreds of men in good practice who have the building trade lists at their finger-ends, and their specifications are full of goods and fittings manufactured by various firms, yet who could not give an intelligible reason for employing them beyond that they are well known in the trade. By using this or that material, and specifying that the rooms are to be finished in somebody's patent decoration, a heavy amount of personal labour is taken from their hands.

Our chief object here is to indicate one or two of the means by which these agencies of the modern architect can be made to contribute to art, and at the same time render service to the manufacturer. Take, for example, the art of brickmaking and cutting. The architect usually specifies bricks of a certain maker, providing for ornamental bricks or terracotta of a selected pattern. But does he take the trouble to find out whether he gets them, or that the contractor is not using some inferior manufacture? Now the manufacture of bricks and the method of cutting are matters that very deeply concern the design in which brickwork is ornamentally employed. The contractor manages to save a few shillings per thousand in his purchase of bricks. It is within the cognisance of all architects what an immense variety and make of brick there is in the market, that a certain kind may be specified of uniform shape and colour, which turn out of inferior quality. They know, too, that the superior bricks are generally picked. If there is much

gauged work in the building the texture and quality are everything—the “rubbers” used should have that happy combination of sand and clay in their composition to produce the sharpness of angle and evenness necessary. The architect, we say, should have more voice in the matter of selection, and for this purpose he should know something of the earths and clays found in the neighbourhoods of London, Reading, Brackley, Woolpit, Fareham, and other districts which supply the market.

Certainly the most effectual way of securing the best materials and workmanship is to retain the control and selection of the goods, instead of allowing them to pass entirely into the hands of the contractor. By dealing with them himself the architect would more quickly become master and judge of materials he now knows very little about, under the usual contract system. Under the contract he can be put off with inferior goods, and has often too little inclination or wish to deprive the builder of any profit he may make. But by reserving in his own hands the selection of materials and fittings these risks are at once obviated. With many architects there is a manifest objection to deal with matters they think beyond their legitimate duty as supervisor—a mistake that has sprung from the modern notion of the architect's work. Among those who think otherwise may be numbered the majority of the leading members of the profession who take a deep interest in everything that concerns the fitting and decoration of building, even to such details as the design of gas fittings, furniture, and picture-frames. The large field open to selection makes it the more reasonable that the architect should exercise his judgment and taste, especially if he desires to influence the arts allied to his own. On other grounds there are equally good reasons for this general supervision; if the architect has discretionary power in the selection, the client is better able to make his requirements understood, and there is room left to make any modification that may be thought necessary as the work progresses.

In any new form of contract which may be framed for the profession—and a committee of the Institute have been dealing with the subject lately—it would be desirable to leave a clause giving the architect an optional power of selection, and to make any modification in the price. We do not overlook the practice of dealing with “provisional sums.” In quantities there are frequently certain sums set down for items, such as chimney pieces, ironmongery, painting, and decoration; a system that could be extended to other things where it is desirable to give the architect power to make special contracts. To provide in the quantities a stated net amount for the fittings or goods appears to be the most equitable way of proceeding. Should the provisional sum not be expended, it would be deducted from the contract amount in case it is spent, of course allowing a certain percentage to the builder.

To name a few of the specialities and patented inventions now employed. Sanitary appliances are very numerous. To specify is not always to obtain the real article. Take, for instance, glazed stoneware and traps. If a certain kind is to be adopted, it is necessary to state, if possible, the name of some well-known firm's goods. The arrangement for intercepting sewage gas ought to be clear, and the architect should provide a well-constructed inspection-chamber and trap in a convenient position outside the building. It would be safe, in this case, to mention the name of the maker, such as Doulton and Co., or of some equally good interceptor and trap. So with closet apparatus and fittings. A general clause in the specification of these, however completely described, might be very inadequately interpreted. Ventilation is another matter

that would receive better attention and be more efficient if it were left to be dealt with by the architect. Under the ordinary contract, in which it is included in the lump sum of the tender, where the architect exercises no control in the selection of the appliances, we find inferior ventilators and fittings introduced, and the result of the work is failure—another system has to be substituted. We know of one or two instances where this has been the case, owing to the plan of including all items in the contract amount to be dealt with by the contractor as he thinks fit. If he can save a percentage by letting out the work to a sanitary firm, he sees no harm; a cheaper and less efficient system is introduced, as a matter of course. These sub-contracts made by the builder are beyond the immediate control and supervision of the architect. The provision for electric lighting is one of those things requiring special attention, and for which a separate contract ought to be made in like manner, if the right system is to be used in any particular case.

Passing to the artistic elements of modern architecture, the materials and specialities used in decoration are more varied and numerous than perhaps at any former epoch. They form special branches of manufacture—many of them conducted in the spirit rather of commercial than artistic enterprise. Mr. Jones, an upholsterer, sets up as art decorator on a large scale at the West-end; while Mr. Smith, maker of sanitary ware, adds to his other manufactures that of producing art faience and painted tiles. Furniture and decorative accessories are combined; everything from window muslins and cretonnes to ironmongery having the prefix “art.” There are other houses conducted by firms, whose names are a guarantee of good taste and artistic design, who engage artists of unquestioned ability to design their wall papers, window curtains, carpets, and furniture. The architect who keeps pace with modern art notions must take notes of these industries; he ought to know not only qualities of manufacture, but the “motive” that ought to rule. To allow the decoration of a house or mansion to be included in the general bill of quantities, and to be undertaken by the builder, is to lend his name and influence to the production of inferior art and cheap finery. Yet we find this sort of business common under the sanction of low contracts. We need only give a note of warning. What is chiefly to be deplored is the mischievous employment of specialities in fittings and decoration that are made to supply the wants of general contractors. Incongruities of design, discords in colour, are prevalent. The directors of public taste—architects—ought to make a stand; but they too readily acquiesce in these things to the prejudice of firms whose work is of a higher order. The materials for floors, walls, and ceilings, and their treatment constitute an important part of architecture. The unity that should run through the design is a function of the architect; but it is lost by the circumstance that these parts are intrusted to three different classes of art workmen. We have floors by one maker, wall decoration by another, ceilings by a third—the result being a jargon of design and inharmonious colouring. The marble mosaic pavement, the tile, wood-block, or parquet flooring, the daodes of dark woods, tiles, or embossed fabrics, the “high-class” joinery, the decorative marble-work and plaster-work are branches that receive the best attention at the hands of specialists who devote themselves to the production, and whose names are familiar to our readers; but they look for the architect's sympathy and influence. When these branches of architecture are controlled by good taste, and when the master-designer regains the position and voice he ought to have in the

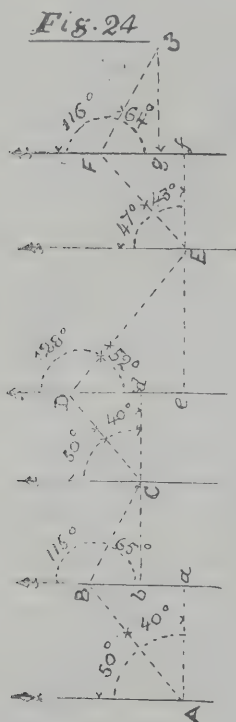


selection of the crafts and allied arts, we may look for a modern architecture worthy of the name and of the industries that contribute towards it.

## LAND SURVEYING.—XV.

### PLOTTING, TABLES, DETAILS.

WE here give a specimen of fieldbook and the tabulation of the angles of a traverse survey of a river having several bends, as an example of practical plotting which the learner will do well to study. We have in a former article referred to the survey of a river of serpentine form, in which the angles made by the several lines are taken one after the other, but without any reference to a magnetic north or meridian. In this diagram the angles are taken from the magnetic north. At each of the points A, B, C, D, E, F, and G, which have been selected and poled near the banks of the river, the angles are respectively  $50^\circ$ ,  $115^\circ$ ,  $50^\circ$ ,  $128^\circ$ ,  $47^\circ$ , and  $116^\circ$  with the magnetic meridian. They are noted on a sketch represented by the dotted line in the diagram, and the angle may be conveniently put down on an arc described from each station of the



traverse. After or during the observation of the angles, the chaining of the lines and offsets therefrom may be proceeded with, the distances being entered on each line of sketch, and the offsets taken on another sketch, the lines being similarly distinguished by numbers. The diagram and the accompanying figures will explain each other. Thus, for example, at A an angle of  $50^\circ$  is read from the magnetic north, and the distance A B measures 1,100 links. Removing the theodolite to B, the upper plate still clamped at that angle, make it bear back on A; unclamp and bring to zero, prove the accuracy of zero to north, and then turn telescope to point C, which reads  $115^\circ$ , and repeat the same equations at each station, putting down against each line or upon the sketch the distance chained.

We now turn to the plotting. Beginning at station A on the left-hand side of the paper, we draw a vertical through it representing the magnetic meridian. Our object is to find the direction and length of the first line A B. We might use the protractor, and prick off the angle  $50^\circ$ , drawing the line and scale the distance 1,100 links on it, a method

that would do for any ordinary small-scale plan; but as accurate results are aimed at, we apply the trigonometrical rule of finding the base and perpendicular of a right-angled triangle from the angle given. In other words, we have to find the sine and cosine of the angle, or, more correctly, the sine and cosine of the complement, for it must be borne in mind that the sine of an angle is equal to the cosine of its complement. For instance, we find that by subtracting the given angle  $50^\circ$  from  $90^\circ$ , we get  $40^\circ$ , which enables us to find the perpendicular or sine required. Therefore,  $90^\circ - 50^\circ = 40^\circ$ . From a table of natural sines we find the sine of  $40^\circ$  is .64279. We multiply, therefore, the length 1,100 links by that number, which will give 707 links as the perpendicular B a. The length of base A a is found by multiplying 1,100 links by the natural cosine of  $40^\circ$ , or  $.76604 \times 1,100 = 842$  links. The angle at B is  $115^\circ$  with the meridian, therefore  $115^\circ$  subtracted from  $180^\circ = 65^\circ$ , and the natural sine of  $65^\circ$  is .90630  $\times$  by the distance 900 links = 815 links length of base; the perpendicular or cosine is  $.42261 \times 900 = 380$ , and so on through the traverse as follows:—

	Length.	Perp.	Base.
A B $90 - 50^\circ = 40^\circ$	1100	707	842
B C $180 - 115^\circ = 65^\circ$	900	380	815
C D $90 - 50^\circ = 40^\circ$	950	610	737
D E $180 - 128^\circ = 52^\circ$	1400	861	1103
E F $90 - 47^\circ = 43^\circ$	1000	681	731
F G $180 - 116^\circ = 64^\circ$	800	350	719

Having tabulated the sides of the various triangles as above, it is easy to set off the perpendicular and base of each triangle, and to draw the hypotenuse or line to the exact angle. As a check, a common horizontal line or plane, as already noticed, can be drawn from G to set off the various bases, and another the various perpendiculars as from a datum. Thus setting off the preceding base distances on the horizontal line (supposing the figure placed horizontally), 842, 815, 737, 1,103, 731, 719 will give the total length of traverse, which ought to agree with a straight line measured on the ground from A to G. From this line the vertical distances or perpendiculars set off at each angle of the traverse should agree with the separate perpendiculars of the triangles, thus proving the accuracy of the plotting.

In concluding this portion of our subject, we may draw the student's attention to the importance of a thorough knowledge of the elements of trigonometry, which can be acquired from any textbook. After the divisions of the circle, the beginner ought to master the various functions of an angle, or

plement being understood the difference between the angle and  $90^\circ$ . The close lines represent the functions of the angle A, those dotted the complementary functions. The reader is advised to make himself familiar with the relative positions of the various lines which constitute the functions of any given angle. Looking at the figure, it will be seen that the complement of an angle of  $30^\circ$  comprises the greater portion of the quadrant, or subtracting  $30^\circ$  from  $90^\circ$  leaves  $60^\circ$  as the complement. The functions of sine, tangent, and secant of  $30^\circ$  are smaller than the complementary functions, or, as they are called, the cosine, cotangent, cosecant, &c. It will be clear that each function varies with the angle. Thus sine A varies from 0 to 1 in the first quadrant, the cosine varies from 1 to 0—a fact that can be seen by referring to any table of natural sines, &c. The angle A shown in the figure is  $30^\circ$ , and the sine of  $30^\circ$  is .50000, or half the radius; whereas the cosine of  $30^\circ$  is .86602, a larger fraction of the radius. In any right-angled triangle, where B is the right angle, and A and C the other two; these angles are complementary, since both together make a right angle. Or if we denote one angle by A, the other is denoted by  $90 - A$ . Or, sine A = cos. C; in other words, the sine of an angle is equal to the cosine of its complement. So also the tangent of an angle is equal to the cotangent of its complement, and the secant to the cosecant of its complement. The student should draw diagrams of the sine and cosine, &c., at various angles and make himself familiar with the numerical values. To take the angle  $30^\circ$  we can find the functions thus—

$$\text{Sin. } 30^\circ = \frac{BC}{CA} = \frac{1}{2}$$

$$\text{Cos. } 30^\circ = \frac{AB}{AC} = \frac{\sqrt{3}}{2}$$

$$\text{Cot. } 30^\circ = \frac{AB}{BC} = \sqrt{3}$$

Or, since  $30^\circ$  is the complement of  $60^\circ - \sin. 30^\circ = \cos. 60^\circ = \frac{1}{2}$ ;  $\cos. 30^\circ = \sin. 60^\circ = \frac{\sqrt{3}}{2}$ ; and  $\tan. 30^\circ = \cot. 60^\circ = \frac{1}{\sqrt{3}}$

Taking an angle of  $45^\circ$ , the student will find that the sine equals the cosine, and the tangent the cotangent. Here  $\sin. 45^\circ = \cos. 45^\circ = \frac{1}{\sqrt{2}}$ ;  $\tan. 45^\circ = \cot. 45^\circ = 1$ , and

$\sec. 45^\circ = \text{cosec. } 45^\circ = \sqrt{2}$ . These functions are exceedingly necessary to be remembered. But the subject is hardly one to be treated here, our chief object being to point out the importance of rationally understanding the numerical values found in the tables.

Certain conventional marks or lines are

Fig. 25

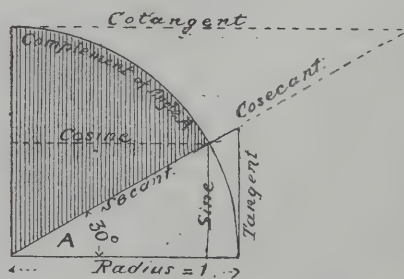
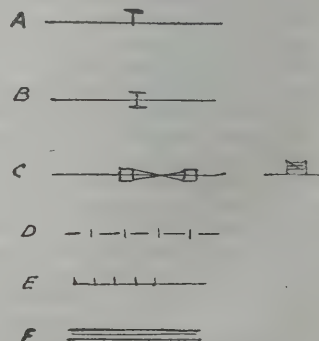


Fig. 25	Sine = .50000
	Cosine = .86602
	Secant = 1.15470
	Tangent = .57735

what is known as the trigonometrical canon. Fig. 25 is a diagram showing the functions of an angle of  $30^\circ$ , with their names. It shows a quadrant of a circle, the hatched part being the complement of the given angle, by com-

Fig. 26. Boundaries



used in plotting which the student should know. A (Fig. 26) represents the line of ditch, the T showing to which side the hedge belongs; B is a fast-set hedge, C the manner of showing gates, D a post-and-rail fence, E close paling, and F a railway.



PRACTICAL ARCHITECTURE WITH  
DETAILED ESTIMATES.—XXV.By HENRY LOVEGROVE, F.S.I., Surveyor.  
EXCAVATOR (CONTINUED).

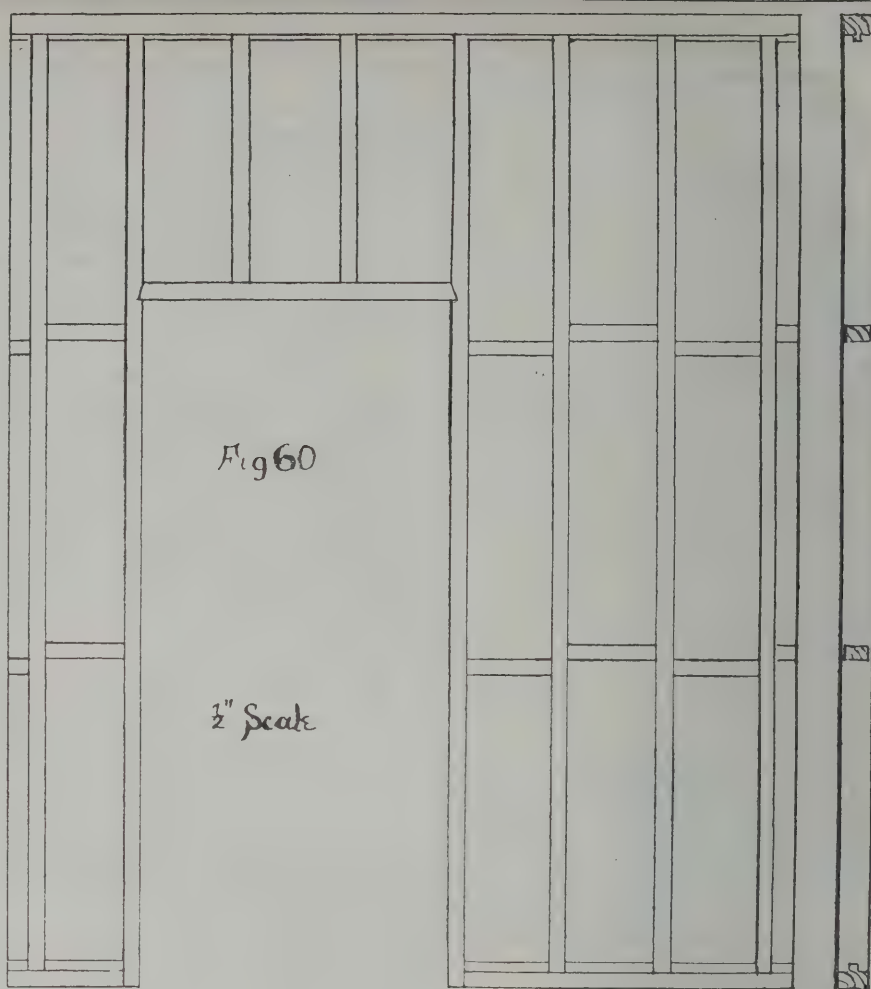
ft. in.	ft. in.	
2 2 10		
2 3 4	9	Dig and cart, a part filled and rammed.
1 3 4		
2 3 4	1 1	Add.
2 10 4		
2 3 2	5	Add.
2 10 9		
2 3 4	9	Add.
232 6		
1 0	232 6	Earth filled in and rammed to outside walls.
1 0		
14 0	168 0	Earth levelled and rammed and concrete 6in. thick under wood floors levelled on surface sitting-room.
12 0		
4 0	24 0	Add bay.
6 0		
7 6	67 6	Add pantry.
9 0		
14 0	196 0	Add kitchen.
14 0		
3 0	2 3	Add do.
9 0		
2 0	7 6	
3 9		
2 3	2 6	
2 3		
2 6	3 2	Deduct do.
2 6		
6 4	7 5	
1 2		
9 0		
6 0	54 0	4. Fenders filled in with concrete and levelled under hearths.
3 6		
1 2	4 1	Red tile paving 6in. square, bedded and jointed in cement, and concrete bed 6in. thick levelled to receive same in entrance to dwelling house.
43 0		
18 0	774 0	PAVING IN STABLES, &c.
		Staffordshire blue chamfered brick stable paving laid to falls bedded and jointed in cement, on and including bed of cement 6in. thick levelled to receive same in stables.
8 9		
8 6	6 5	Deduct do.
16 0		
17 0	272 0	Add coach-house.
88 3		
1 6	132 5	DAMP COURSE.
94 6		Asphalte damp-course 2in. thick, laid whole width of wall.
1 6	141 9	Add.
44 9		
9 9	33 7	Add.
2 1 6		
1 6	4 6	Add.
1 11		
9 9	1 5	Add.
6 6		
9 9	4 11	Add.
2 16 9		
9 9	25 2	Add.
56 6		
9 9	42 5	Add.
4 1 6		
4 2	2 3	Add.
2 1 2		
4 2	11	Add.
2 1 2		
4 2	11	Add.
4 2		
18 0	13 6	Add.
18 9		
9 9	14 1	Add.
9 9		
9 9	3	Add.
37 9		
9 9	28 4	Add.
2 5 0		
9 9	7 6	Add.
2 0		
3 0	7 6	Add.
6 4		
1 2	7 5	Add.
2 6		
2 6	3 2	Add.
7 6		
1 6	11 3	Add.
10 9		
9 9	8 1	Add.
71 6		
9 9	53 8	Add.
3 6 9		
9 9	12 11	Add.
7 0		
9 9	5 3	Add.
1 2		
4 2	5	Add.
1 2		
9 9	11	Add.
18 Terracotta air bricks, 9 by 3, and building in walls with channel through same where directed.		

ft. in.	ft. in.	FACINGS.
3 6		
12 6	43 9	Ex. to red-brick facing as described to chimney.
3 6		
9 9	34 2	
2 3		
11 0	49 6	Add.
14 0		
1 4	18 8	Add cap.
4 2		
10 6	3 11	1/2 B. ex. for ornamental rib.
10 1		Ex. labour forming ornamental rib, 4 1/2 wide 2 1/2 projection.
		1 Extra to forming corbel terminators to do. as sketch.
3 6		
9 9	34 2	Extra to red brick facing lower part of chimney next bay.
17 6	6 7	
3 0	67 6	
11 3		
3 0	52 6	Add chimneys.
8 9		
1 11	76 8	
10 0		
12 0		
1 3	30 0	Add cap.
14 11		
11 3	1630 4	Add.
39 0		
15 0	585 0	Add front wall stable.
23 6		
16 6	387 9	Add next co. house.
4 6		
5 6	12 5	Deduct do.
1 0		
6 0	6 0	Add do. fence wall.
2 3		
6 0	13 6	Circular do.
6 0		
7 6	90 0	Extra to red brick facing piers.
9 9		
6 0	9 0	Deduct do. for walls.
28 3		
6 0	169 6	Add do. fence wall.
30 0		
6 0	180 0	
16 9		
8 9	146 7	Add coals, &c.
37 8		
11 6	433 2	Add.
2 6		
3 0	3 9	Deduct do.
3 3		
4 2	1 3	Add.
6 9	35 5	Add.
1 9		
4 6	7 11	Add extra to bay.
7 9		
195 9	2 11	Add chimney built out.
		Extra to red brick moulding co. house under vertical tiling. All headers.
4 3 3		
9 9	9 9	2. External m.'s.
9 9		3. Mitres returned stopped ends.
14 9 9	136 6	1. Internal m.
		2. S.E. on sply.
200 8		Extra to red brick facing—extra to plinth.
6 6	150 6	Extra to chamfered red brick to top and bottom of panels.
1 0		
6 6		28. S.E.
1 6		Deduct extra to red brick facing for store-plinth capping.
3 3	19 6	Deduct do. for stone band at level of stable ww. sills.
1 2		
1 3	2 11	Deduct extra to red brick facing plinth to pilasters.
6 1 0		
6 7	39 6	Deduct do. shafts and cap.
1 0		
9 9	4 6	
5 9 6		
9 9	35 8	Deduct do. for arches.
4 3		
1 6	6 5	HEARTHES, &c.
2 0		
1 2	2 4	2in. rubbed Yorkshire stone slab and hearth in sitting-room.
7 3		
		4in. by 3in. rubbed York curb to hearth, rounded on top edge, including fixing and all joint.
2 M.		
1. Di. moulded chimney pieces to design, p.c., and fixing to 2ft. opening and (4).		
1. Slow combustion grate, p.c. 15s., and setting to 2ft. opening.		
1. Flue c. and p.		
1. Rough relieving arch over fire-place opening in cement.		
2 0		
3 0	6 0	1 1/2 B. deduct.

ft. in.	ft. in.	
5 6		
1 6	8 3	2in. York slab and hearth as before in kitchen.
4 0		
1 6	6 0	
		1. Kitchen chimney-piece with stone mantel and jambs, 9in. wide, and deal wrought shelf on cut wood brackets, and fixing complete with all necessary iron cramps and (4) to 4ft. opening.
		1. Kitchen with oven and boiler to 4ft. opening and setting p.c. £2.
		2 by 1/2 wrought-iron chimney bars, with ends split and turned up and down.
		1. Rough relieving arch over fire-place opening in cement.
4 0		
4 0	16 0	2 B. deduct.
3 3		
1 6	4 11	2in. York hearth as before in harness-room.
1 9		
1 2	2 1	
		1. Stone chimney-piece with 9in. mantel, jambs, and shelf, and fixing with all necessary cramps to 1ft. 9in. opening and (4).
		1. Slow-combustion grate p.c. and setting to 1ft. 9in. opening.
		1. Flue c. and p.
		1. Rough relieving arch over opening.
1 9		
3 0	5 3	1 1/2 B. deduct.
		FIRST FLOOR.
2 1 9		
1 2	4 1	2in. rubbed York hearth, &c.
3 3		
1 6	9 9	
2 3 3		
1 7	10 4	Do. do.
2 3 3	6 6	F.E.S.
		2. Iron grate with chimney-piece p.e. and setting to 1ft. 9in. opening and (4).
		2. Flues c. and p.
		2. R. relieving arches in cement as before.
2 1 9		
3 0	10 6	1 1/2 B. deduct.
		2. Filling in with concrete over trimmer and levelling same for hearth.
2 1 6		
1 2	3 6	York hearth as before.
2 3 0		
1 6	9 0	
2 3 0		
1 7	9 6	Half-brick trimmer and centring.
2 3 0	6 0	F.E.S.
		2. Iron grates and chimney-piece to 1ft. 6in. opening and (4) as before.
		2. Flues c. and p.
		2. Rounded relieving arches over opening as before.
2 1 6		
3 0	9 0	1 1/2 B. deduct.
		MASON—RED MANSFIELD STONE.
5 0		
3 11		
1 3	24 6	Red Mansfield stone in chimney cap next bay window.
2 3 9		
3 11	29 5	Plain bed and joint in cement.
5 0		
3 11	19 7	Plain face.
		2 sinking perforation through 15in. stone cap 14in. by 9in. for flue.
17 10		
1 9	31 3	Molding.
2 2 1		
3 2		
10	11 0	Red Mansfield stone in lower part of cap.
2 3 11		
3 2	24 10	B. and joint.
10 6		
1 1	11 5	Moulding.
3 8		
1 1	40 0	S. do.
		4. Mitres.
		2. S.E.
6 6		
3 6		
		3 Plain face.
		2. Sinking perforation through 10in. for flues as before.
2 1 4		
9 9	1 6	Red M. stone in weathering to set off.
2 2 1		
9 9	3 2	Plain bed and joint in cement.
2 1 4		
9 9	2 0	Plain face.
9 9		
1 0		
10	8	Sunk face.
		Moulding 4in. girt in S.L.
1 5		
9 9		
9 9		
2 2	10	Red M. stone in weathering as before.
1 5		
9 9	1 8	Bed and joint in cement.
1 5		
9 9	1 1	Plain face.



ft. in.	ft. in.	
1 0	9	Sunk face.
1 4	9	Red M. stone as before.]
2 1	9	Plain bed and joint.
1 4	1 0	Plain face.
9	8	Sunk face.
10	9	Moulding 4in. girt in S.L.
4 1 9	5 3	Red M. stone in corbels to brackets under projecting story.
4 1 9	12 3	Plain bed and joint.
2 1 9	3 6	Plain face to side.
1 0	4 6	Plain face.
1 5	4 3	Moulding,
4 9	2 3	Plain face to top.
	4	Sinking in top of corbel for oak bracket.
2 1 0	2 0	Red Mansfield stone in window jamb to bay under bracket.
2 2 0	4 0	B. and joint.
2 1 0	4 2	Sunk face collected.
2 1 4	2 11	Red Mansfield stone in window jamb and corbel for bracket.
2 1 4	5 7	B. and joint.
2 1 0	1 8	S. sunk face.
2 11	1 10	Sunk face.
2 1 4	2 8	Plain face.
2 1 1	2 11	
2 1 1	2 6	Moulding.
	2	Sinking in top of corbel for oak bracket as before.
2 7	3 6	Red Mansfield stone in window jambs above corbel.
2 3 3	7 0	B. and joint.
2 9	4 11	Sunk face.
2 3 3	6 0	
2 2 0	9	Red m. stone sill to bay.
2 3 0	2 8	Add.
2 2 6	1 11	Bed and joints.
2 3 6	5 3	
2 2 0	1 6	Sunk face as weathering.
2 3 0	4 6	
2 2 0	2 0	Moulding 9in. girt.
2 2 5	4 10	Do. but stopped.
2 8		2. S.E.
2 2 0	8	Sunk face.
2 1 2	2 4	Stone in angles of sill.
2 2 6	5 10	B. and joint.
2 1 2	9	Sunk joint.
2 2 5	4 10	Moulding 9in. girt
2 11	11	Sunk face.
2 6		
CHIMNEY CAPS.		
2 4 2	32 1	Red M. stone in chimney cap.
2 3 1	33 5	B. and joint in cement.
2 5 5	25 8	Plain face.
2 3 1	4	Sinkings through 15in. for flues, 14in. by 9in.
2 4 2	31 5	Moulding.
2 3 1	8	Mitres.
2 14 6	27 0	Chamfered 6in. W.
2 1 1	8	Mitres,
2 3 10	16 4	Red M. stone in lower part of cap.
2 2 10		
2 9		



## CARPENTRY AND JOINERY.—IX.\*

## PUGGING AND PARTITIONS.

WHEN houses are built in flats, and sometimes under other circumstances, it is necessary to prevent smells or sounds passing from one story of a building to another as much as possible. For this purpose resort is had to a process called "pugging," or in some localities "deafening," which is rough flooring or boarding laid upon fillets or bearers nailed to the joists about half-way down, and upon this rough flooring is spread a mixture of mortar, earth, and smith's ashes; sometimes coarse plaster is used instead, or even dried moss.

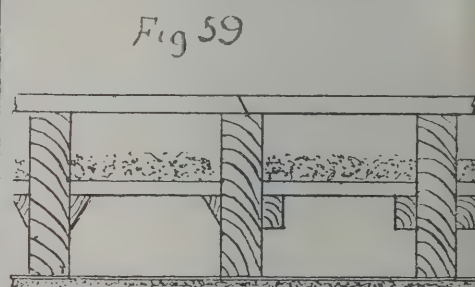
Fig. 59 shows how the rough boarding, filletting, and pugging is put in. The fillets may be either rectangular or triangular in section—both are shown in the figure. The fillets should be nailed on before the joists are fixed in their position. In reference to the pugging, the presence of lime in contact with wood will, of course, destroy it in a comparatively short time, so that this is objectionable. Joists and flooring should be ventilated. The writer has bored holes in joists in order to allow a free passage of air throughout each floor of joists. It is taken for granted that "air-bricks" are inserted in the walls during their erection, and opposite to the joists. If ceiling joists are attached to the bridging or common joists, it is not necessary to bore holes to allow of ventilation. Again, communication with the outer air is sometimes denied, just because it affects the temperature of the house, and especially when heating apparatus is used; but tongued and grooved floors will partially remedy, and a different method of heating in addition, will almost entirely remove the difficulty. But it is absolutely essential to ventilate all timbers used in house-construction. Rather, apart from the subject of ventilating timber, is that of preventing it, as far as possible, catching fire; the most recent article recommended and tried is silicate of cotton, with which timber near to flues and fireplaces is protected.

## PARTITIONS.

When an upper story of a building has to be divided in a manner different from the one

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below, brick walls cannot be used in order to divide the space unless beams are built in, upon which to rest them, which would be oftentimes very objectionable and also expensive, when the same result can be arrived at in a slightly different way—viz., by the use of timber partitions, which may be placed anywhere, and can either be supported by the joists (they being made a little stronger, to support the extra weight), or the partitions can be trussed, and in that manner be self-supporting—that is, their whole

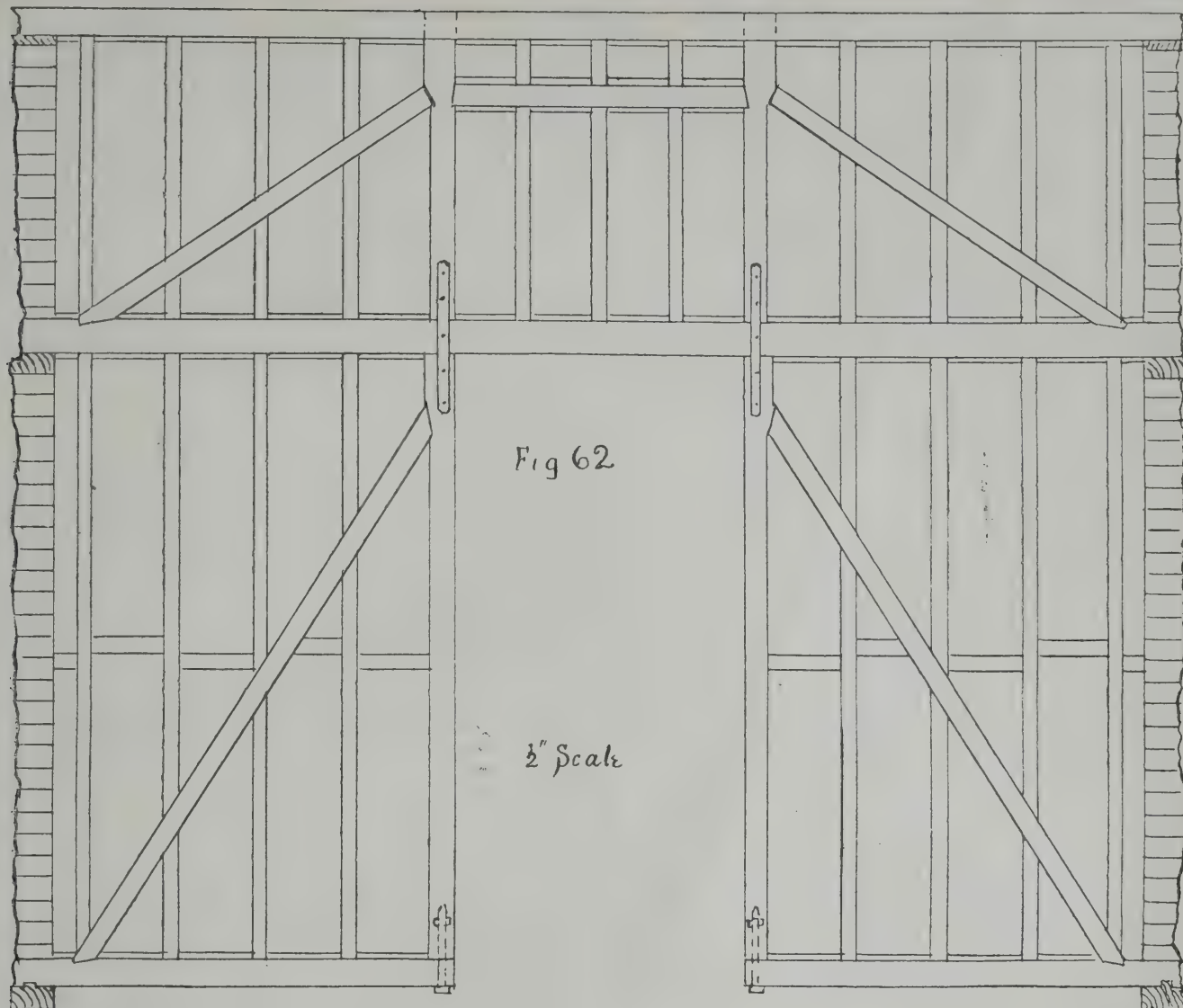


1" Scale

weight can be thrown upon the walls of the building. In the common class of buildings, when timber partitions are put up, they are not trussed, but formed of studs reaching from floor to ceiling in one length.

Fig. 60 shows the construction. A sill-piece is laid along the floor or joists and nailed, of the section shown in Fig. 61, and along, underneath the ceiling joists, another piece of similar section is nailed. Props are then put up temporarily, in order to keep the ceiling-joists level until the studs are put in position, if they are not already level. The length of the studs is taken with a rod or lath, and one put in about every 4ft., then fill in the intervals. It may be necessary to remark that the spacing of the studs should, if possible, be arranged to suit the lengths of the laths, which are of certain



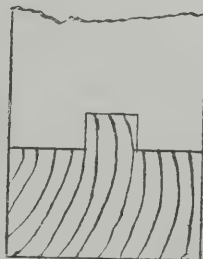


standard lengths—3ft., 3ft. 6in., 4ft., 4ft. 6in.; non-attention to this would necessitate the laths being cut, thereby losing time, in addition to the waste of the lath-ends. Should a doorway or doorways occur, the sill piece cannot be carried along across it or them; it is, therefore, cut fair with the studs which form the doorway. Should the partition run in the same direction as the joists, it will be necessary to put in bridging pieces between the two joists at the place where the partition is to be, and about 2ft. apart, in order to nail the sill-piece to, and for its support; this applies also to the ceiling joists, in case the top piece runs in the same direction, which they do. It seems almost unnecessary to state that the top and bottom ends of the studs have a gap cut in them to fit the sill and top piece, as shown in Fig. 61.

The studs are braced or bridged in the manner shown, a centre line being drawn, and the bridging (nogging) pieces being nailed above and below alternately; the last one to be put in being the central one, which should be from  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long, in order to tighten all up. This last piece is got in by introducing it, say, 2ft. higher than its proper position, where it can be readily put in and driven downwards until it has reached its proper place. The object of placing the bridging in the manner described is in order to admit of each piece being nailed at both ends, which could not be done if they were all in one straight line. It would be an advantage if these bridging pieces were put in a little narrower than the studs, as thereby the key of the plaster would not be interfered with, which is very important. For the same reason studs should not be more than 2in. thick. The object of the sill and top piece being made of the section shown is that, in lathing, the constant nailing would drive the studs out of their right position were it not for the fillet, which fillet should be of the solid, but is sometimes nailed

on for sake of cheapness. Instead of bridging (nogging) pieces, sometimes a strap, say, 2in. by 1in. is let into the studs along the whole length of the partition, avoiding doorways, of course, which has a binding effect upon them, but does not brace them so well as the other. The stud next the wall may be kept 2in. or 3in. away from it, as the laths will carry, and

Fig 61



3" Scale

the plaster will key better than if the stud were hard up against the wall. It may be noted that if the studs are 11ft. or 12ft. long, there should be two rows of bracing. A trussed partition differs from the above in that heavy timbers are introduced to form what might be termed the skeleton or framework of the partition, the main part of which is a truss of king or queen-post form, and which serves to hold up the under part of the partition by suspension. In this under part, of course, the doorways occur.

It would be an advantage if the studs used were 1in. wider than the heavy timbers forming the truss, &c., and a  $\frac{1}{2}$ in. piece nailed across on each side of the heavy timbers to continue the line of studs, and as a provision for the key of the plaster. Let it be understood that the laths are kept a little apart, in order that the plaster may be forced through these openings, and on account of the cohesion in the plaster; after it has passed through it hangs down on the inside of the laths, and when hard holds the plaster on in front, thus acting as a rivet. Now it is very essential that no large surface of timber should interfere with the plaster thus passing through to rivet or key on the back side of the laths; therefore the above arrangement is recommended. This will add a little extra to the cost, but under certain circumstances this is not much of an objection. Such a partition as is shown in Fig. 62 is framed in a similar way to a roof truss. The queen-post truss which is seen in the figure is mortised and tenoned together in the same way that a roof truss would be, the queen-posts being tenoned into the top plate, against which the upper ends of the studs abut. Should the recommendation suggested above, as to making the studs 1in. wider than the framing, be adopted, then there would be room for the ironwork (straps) at the various joints of the truss; but bolts can be made to serve. The sill is shown kept to the doorpost by a bolt. The doorpost would have a tenon stumped (tusked) in, say, an inch into the sill, in addition to this. An iron knee or strap and bolt combined, could be used to connect the doorpost and sill together. A bolt would serve to fasten the brace and sill together, as also the brace and *intertie*, or middle piece. The arrangement shown in Fig. 61 would also be carried out in the sill, *intertie*, and top plate of this partition. The stud lines are not shown across the *intertie*, top plate, and braces



as they should be; but inasmuch as the plan recommended is not generally used, the figure has been drawn without, and the explanation will suffice. It will readily be seen that such a partition as Fig. 62 indicates must be put in its place when the floor of joists connected with it has been laid. It could be very much strengthened by putting a bolt between each doorpost and the stud next to it, but close to the doorpost, through sill, intertie, and top plate, as also the braces which occur between these. Fig. 62 is the case of a partition occurring at right angles to the run of the joists; as should it occur otherwise the sill could be continuous and might be made much deeper, seeing that it could be placed between two of the joists, and the top of the sill could be kept down on a level with the joists. The sill may be in every case the full width of the studs, as no plastering occurs, the skirting of the room reaching further up than the depth of the sill in any case. There are many different designs of partitions, but the principle of putting them together being understood, all else becomes easy.

### THE POUGHKEEPSIE BRIDGE.

THE important undertaking of bridging the Hudson River at Poughkeepsie is now an accomplished work, and some particulars of the great bridge may be of general interest. The idea of the scheme took practical shape in 1871. Eminent authorities were consulted as to the possibility of spanning 2,600ft. by a suspension bridge; Captain Eads pronounced it too long for a structure of this kind, and recommended four piers 500ft. apart, and this proposal was adopted. The design consists of five great spans with cantilever trusses over the centre and side spans. The total length between the anchorages is 3,093ft., and including viaducts 6,767ft. The bottoms of trusses are fixed at 130ft. above high water, a height that required, with the depth of truss necessary, an elevation of 212ft. above high water, as the grade of base of rail. The piers were commenced in 1886. The general design consists of a crib and grillage extending from the gravel to 10ft. below high water; on this is a masonry pier 30ft. above high water, carrying a steel tower 100ft. high to pedestals of trusses. These cribs are built and launched over site. The base of each crib is 60ft. by 100ft., and the height 104ft.; it is built of 12 by 12in. white hemlock. The lower part is composed of five prisms of solid timber, 20ft. high, triangular in cross section, bases uppermost, with cutting edges below. These prisms inclose two truncated pyramidal spaces, divided into 14 smaller ones by six bulkheads of timber 2ft. thick, and are built into the solid cribbing. The subdivisions thus made form dredging chambers 10ft. by 12ft., which after being dredged of loose material are refilled with concrete. Thus a series of 14 concrete piers is formed, extending out at the bottom under inverted prisms, and forming a footing. The crib follows the dredging easily, weighting, building, and dredging being carried on until the crib has reached a firm bottom. The cribs were sunk 20ft. below high water. The floating caisson being towed over the crib and anchored, masonry was commenced. The ashlar of the masonry is in courses, varying from 2ft. 9in. to 1ft. 10in. The concrete backing with large stones embedded makes the pier a monolith. Domestic cement was used in the concrete for cribs and Portland for the masonry. The mortar is mixed of one part of cement and two of sand; the concrete backing contains  $1\frac{1}{2}$  barrels per cubic yard. Considerable difficulty was experienced in launching and loading the cribs against the ebb tide, which was strong at times, and once carried a crib three miles down the river. In the construction of the superstructure the towers at the ends of the span were first erected; then, commencing at the fixed end, the bottom chord was laid along on camber blocks; the traveller then erected the span, commencing at the centre, and finishing each half successively. The 160ft. cantilevers were erected by means of projecting travellers. Four sets of false work have been employed; these were necessarily of considerable height, and of great stability and strength. These particulars have been derived from Mr. John F. O'Rourke's paper on the subject, read before the American Society of Civil Engineers.

### BUILDING CONSTRUCTION AND DRAWING.\*

THIS is another elementary class-manual or textbook on the subject of building construction which is quite a necessary theme in the technical schools. Mr. Charles F. Mitchell, the author, is lecturer on building construction at the Polytechnic Institute, and has therefore, it may be presumed, mastered the methods employed. The subject-matter is known well enough by architect and builder—practically at least, though they may not be the happiest in imparting instruction in a systematic manner. A lecturer on building construction, though he cannot be an expert in every trade he professes to teach, possesses the method of imparting instruction; and the details and technical methods of construction are presented by him in a more scientific order. In this case the author has been assisted by other gentlemen—lecturers on plumbing, carpentry, brickwork and masonry, and engineering, at the same Institution, and his work is therefore, well revised and up to date. The engravings are accurate and clear, every part having the dimensions figured. The drawings of English and Flemish bond, showing the arrangement of the bricks and plans of alternate courses, and the plans of quoins, piers, and brick reveals, form a very useful and complete elucidation of this important trade, which has been revised by Mr. H. W. Richards, lecturer on brickwork. The chapter on masonry is carefully written and amply illustrated by elevations and sections of different kinds of masonry walls. The technical methods of forming joints, cramps, joggles, tabling, dowels of stone, slate, cement, and metal are clearly explained. Girders receive careful attention; sections and elevations given of cast and wrought-iron girders are minutely dimensioned, and the rivets, angle-irons, and stiffeners shown. The same care is shown in the chapter on iron roofs, where every part of an iron truss up to 50ft. span is detailed and figured, and the connections illustrated. This portion of the work has been revised by Mr. H. J. Spooner, C.E. Carpentry and Joinery are well done; the methods in use are explained by the aid of neatly-engraved diagrams, plans, and sections, a good deal of information being derived from Tredgold. The author shows several methods of using rolled iron joists as binders in floors. The ordinary operations of joinery, too, are briefly dealt with and illustrated by some good engravings, the whole having been revised by G. Campion Pope. Plumbing and slating are noticed at some length, and the subject of stepped flashing round chimney stacks, and lead-covered gutters and cornices, is explained. The Science and Art syllabus and specimens of the examination papers given make this manual useful to all those about to study construction, and who desire to enter the elementary stage of the Science and Art Department.

### BRICK-CUTTING AND SETTING.†

A VERY handy little treatise on practical brick-cutting and setting. The author, Mr. Adam Hammond, is the author also of a treatise on "Practical Bricklaying," which we noticed some time ago, and in this volume he has shown the methods used in setting out various kinds of arch work, groins, and other details, of applying the bevels—a subject which the workman has been obliged to acquire from actual practice owing to the expense of works in which the operations of the brick-setter are set forth. The first section shows how a circular arch on a circular plan can be set out, or the scriber made for marking the bricks of the arch. The instruction is hardly so clear to the novice as it will be to the practical brick-cutter. The second method of development is more plain to the reader, though the author says the first method will be found the safest and most correct to obtain the face. The setting out of semi-elliptical, segmental, elliptical, and other forms of window, and of the rustications, are treated in a practical manner. The cutting of bricks for niches, the

forming of centres for the head of niche are described by two or three methods, the author giving preference to a method in which a kind of rib with template is made, and worked as a running mould. The rules for cutting groins and domes are simple, and those for taking the bevels and applying them to the bricks for the groin point. The execution of columns cut in gauged work, the making of the box for the converging courses of bricks, brick volutes and scrolls, consoles, key bricks for arches, setting out doorways and windows, pediments, mouldings, and curvilinear work are dealt with, and the remaining sections are devoted to remarks on materials for cutting artificial stone and the rules for measuring gauged work. The author has treated the subject from a workman's point of view; the methods are thoroughly practical, and such as can be understood by the working brick-cutter. Numerous engravings illustrate the text.

### CHIPS.

Mr. George H. Lock, C.S.I., inspector of works under the Cardiff Corporation, has just patented a fresh-air inlet for drains. The object of the apparatus is to prevent any back draught. When a drain is used a talc valve in the inlet closes, thus preventing the escape of sewer gas. This valve remains closed till the pressure upon it is removed, when it opens automatically for the eruption of air. The box containing the valve has a perforated lid or cap.

An extensive fire occurred on Friday night in the extensive premises of Messrs. Bissett and Sons, contractors, of Sheffield. It was found that the fire originated in a large central building, in the lower portion of which was stored valuable timber. The upper part was used as the joiners' shop, and was filled with machinery. The building was gutted. The efforts of the firemen were directed to the saving of the adjoining property. The loss, which amounts to many thousands of pounds, is covered by insurance. The tools of the men were destroyed.

At the first annual meeting of the Dundee and District Council for the Registration of Plumbers it was stated that in that district alone 38 master plumbers and 105 operatives had received certificates of registration from the Plumbers' Company, while the company had also granted a sum of money for the promotion of similar classes throughout the district.

The death is announced, at the age of 56 years, of Mr. Henry Heath, of Hornsey, river surveyor to the New River Company, in whose employ Mr. Heath had been for the past 36 years.

The new free library at Winsford, Cheshire, was opened last week. It has cost £1,050, and has been built from plans by Mr. Francis Shaw, of Winsford; Messrs. George Hanlet and Sons, of the same place, being the contractors.

St. Peter's parish room, North-street, Tunbridge Wells, was formally dedicated on Tuesday week. The building was till recently used as a girls' schoolroom, but has been re-seated and renovated for its new purpose by Mr. Hudson, of Southborough, from plans prepared by Messrs. Cronk, of Tunbridge Wells.

A Sunday-school at Bushey, Herts, in connection with the parish church, was opened last week. The edifice has been built by Mr. J. Field, of Bushey, from the designs of Mr. C. H. Rew, of Berkhamstead, whose plans were chosen from those submitted in competition in the autumn of last year. The school is about 60ft. in length, 35ft. wide, and 27ft. internal height. It comprises two large rooms, which are so constructed as to be available for concerts and entertainments, when thrown into one, by the removal of a shifting screen, and classrooms. The cost was £1,200.

A new Home and Mission House at Emscote, for the parish of All Saints, has just now been completed and occupied. It is situated near the canal bridge upon the New Warwick-road, and is a brick and stone building of 15th-century work. Mr. J. Cundall, of Leamington, designed and superintended the buildings, which have been carried out by Mr. Bowen, of Leamington.

The Prince of Wales will open the new municipal buildings and town-hall at Middlesbrough, erected from designs by Mr. G. Gordon Hoskins, of Darlington, at a cost of £100,000, on the 22nd January.

Messrs. Garden and Co., King-street, Aberdeen, have completed a monument to be erected in London to the memory of Jenny Lind by her husband. It is of highly polished Swedish granite, in the form of an Ionic cross, measuring about 10ft. in height. On the die below a marble medallion is an inscription.

\* Building Construction and Drawing. By CHARLES F. MITCHELL. First Stage, or Elementary Course. London: B. T. Batsford, 52, High Holborn.

† The Art of Practical Brickcutting and Setting. By A. HAMMOND. London: Crosby Lockwood and Co.



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## ILLUSTRATIONS.

THE ALCAZAR, ST. AUGUSTINE, FLORIDA.—OAKWELL HALL, BIRSTAL.—DESIGNS FOR A POLICE STATION FOR A COUNTRY TOWN.—THREE SOMERSETSHIRE TOWERS.—SKETCHES AT MESSRS. FOSTER'S.

## OUR LITHOGRAPHIC ILLUSTRATIONS.

## THE ALCAZAR, ST. AUGUSTINE, FLORIDA.

VIEWS, plans, and details of the Hotel Ponce de Leon were published in the BUILDING NEWS for Nov. 23 last, with a description of this extensive pile of buildings, erected from the designs of the architects, Messrs. Carrère and Hastings, of New York. To-day we give a general perspective by Mr. Hastings of the Alcazar, which adjoins the hotel already mentioned. The plan given in the margin shows how this interesting block is planned and arranged, while on the upper floors are a vast number of bedrooms for the use of visitors to the hotel proper. To the rear of the buildings are a series of croquet and lawn-tennis courts. Russian, Turkish, and sea-water swimming-baths form a great feature in the Alcazar, and there are billiard and card-rooms, &c., besides an assembly-hall for entertainments of all kinds. The walls are of shell-composed concrete, with red terracotta dressings.

## OAKWELL HALL, NEAR BIRSTAL.

THE plan and enlarged details of the screen and hall of this fine old mansion, reproduced on the accompanying lithographic plate, furnish a valuable supplement to the illustrations already given of the building in our pages last year (BUILDING NEWS, Jan. 28, 1887), when the elevations to scale were printed, with some details of the schoolroom. An oversight alone caused the present plate to be thus delayed. It shows three sides of the central hall, with the galleries running along the end facing the entrance and over the fireplace. They form the approaches to the rooms on the first floor, and are reached by the staircase entered by way of the wicket to the left of the chimney-breast. The screen placed in the regulation position divides off a vestibule leading to the porch; but the kitchens, &c., are at the other end of the hall in the same wing as the withdrawing room. Figured dimensions are drawn on the plan. The woodwork is of oak, and the walls of the house are of fine sandstone, the roofs being covered with grey slates. It was erected in 1583 by the Batts; but the property is now in Chancery. The last of the long line of the builders' family died in 1707. The author of the drawings herewith published is Mr. Fred. Mitchell, of Huddersfield. The Leeds and Yorkshire Architectural Society awarded him a silver medal for the set thus completed.

## DESIGNS FOR A POLICE-STATION IN A COUNTRY TOWN.

For description see p. 861.

## CHURCH-TOWERS OF SOMERSET.

THESE three towers may be taken as broadly representative of the three main designs of Somersetshire towers. I have sketched every one of note, and find them nearly all founded on the lines of one or other of these. Evercreech strongly resembles Wrington and St. Cuthbert's, Wells; Banwell, which is the com-

monest type, is very similar to Cheddar, Axbridge, Winscombe, Shepton Mallet, and many others, more or less simple in design; Huish Episcopi is like Kingsbury, &c. There are a few noteworthy examples, however, which are different from any of these, such as Dundry, Chewton, Taunton, Wrington and Chewton were illustrated in the BUILDING NEWS for July 31, 1885.—HARVEY PRIDHAM.

## SKETCHES AT MESSRS. FOSTER'S.

WE give a sheet of sketches of decorative furniture from a recent sale at Messrs. Foster's galleries in Pall Mall. The little Antique Dutch Cabinet was carved in low relief with figures and conventional ornamentation. The miniature Chest of Drawers was only about 1ft. 6in. high, and was used, we should think, more as a jewel cabinet than anything else; the escutcheon and handle were beautifully chased. The Stool was one of a pair in the Late French style, and would make a good pattern for manufacturers to work from. The Old English Cabinet was of oak, of the Jacobean period, the three panels at the top being filled with stiff Late Gothic designs, the return at end having line panels instead; the two drawers below being filled with the same kind of running ornament. The cabinet was open below, but the back is filled in with linen panels, and a small shelf below. The Empire Candelabra was of ormolu of pretty design, with two branches and a small vase in the centre. There were at this sale several other good cabinets and pieces of French furniture.

## COMPRESSIVE STRENGTH OF BRICKS AND PIERS.

THE results obtained by the Watertown experiments on the compressive strength of cements and mortars are instructive. The compressive tests of three kinds of bricks are of interest. 1. The hard-burned face bricks from North Cambridge, Mass., showed an average crushing pressure of 13,925lb. per square inch; the average at which flaking-off occurred was 7,100lb. per square inch. 2. Thin hard-burned common bricks flaked at an average pressure of 8,800lb. per square inch, and crushed at an average of 18,337lb. 3. The Bay State medium bricks from Cambridge and Boston flaked at an average of 6,620lb., crushing at an average of 11,406lb. Flaking occurred generally at about 5,000lb. pressure. Passing over the cement tests, we come to the record of brick piers. The bricks were laid on the bed, joints broken. The highest resistance was shown by piers laid in Portland cement. The experiments go to show that when lime mortar is used, the yielding chiefly took place in the joints. Cracks first appeared at the surfaces of the piers, snapping sounds were heard long before the cracks appeared, in one case at 200lb., in another at 300lb., in others at 400lb. and 500lb. per square inch. In one case the sound was heard after 1,800lb. was tried, and the average at which it occurred is stated to be about 900lb. It was found also that the second application of a load, after release from the first, often caused an increase in the compression. The report continues: "The remarkable fact comes out by one of the experiments that under application of a lighter load after a heavier one, the set perceptibly diminishes, and this occurs quite near the load causing rupture. For example, a pier 12in. square, 73in. high, gauged length 50in., gave at 130lb. per square inch a total compression of '0103in., increasing in five minutes to '0109in. On release to 70lb., the set measured '0065. At 348lb., the compression was '0504, increasing as before to '0527. On release to 70lb. the set was '0328, diminishing to '0327 in five minutes. Again at 556lb. the compression was '0955, increasing to '0994. On release, as before, the set was '0653, after five minutes '0649, and after 65 minutes '0646. At 694lb. the first crack appeared, and compression after five minutes was '1334, diminishing on release to 70lb. to '0908, and after five to '0902. Total failure occurred at 1,210lb. per inch."

It was found also that hollow piers were of about the same strength as solid per inch of solid section, the mortar being the same in both cases. With increase of age the resistance is

found to be greater. The brick piers in lime mortar showed the important part played by the mortar. We have no room to analyse the tables appended to the committee's report, nor the series of diagrams representing the curves of pressure. Of course, these experiments give only approximate results; further tests are to be made. For the architect the pressures at which surface cracks or flaking off appear are those alone of any value as indicating the strength of piers. These cracks pre-suppose a certain amount of crushing of the mortar joints or brick, and therefore a settlement; added to which the usual vacuities in brick piers to buildings, and the want of evenness of pressure over the whole section of the pier will be found to still further reduce the figures we have cited.

## ROYAL INSTITUTE OF ARCHITECTS OF IRELAND.

THE annual general meeting of this institute was held on Saturday last. Mr. Thomas Drew, R.H.A., presided. Mr. Murray read the annual report. The council had not seen its way to support the Architects' Registration Bill, which was introduced into Parliament without success; but when the proper time arrived they hoped to co-operate with their brethren in the matter. With regard to the affiliation of that Institute with the Royal Institute of British Architects, they did not see their way to recommend the step at once. It would be attended with the danger of their Irish Institute losing its identity, and while willing to co-operate with the British Institute in the interests of the profession, they deemed it better to preserve their independence. They had had a correspondence with the Board of Works and other public bodies with regard to the grievance of having works taken up by the officials.

Mr. J. L. Robinson moved the adoption of the report, and said it reflected great credit on their secretary, and the manner in which he had done his work. The matter with regard to officials taking works had been in the hands of the Lord Mayor for some time to have it brought up in Parliament.

Mr. J. J. O'Callaghan, F.R.I.A., seconded the adoption of the report, and said that he thought the feeling was very strong against the amalgamation of that Institute with the Royal Institute of British Architects. They should maintain their individuality, and they had frequent experience of the advantages attending membership of an institute like theirs in courts of law and elsewhere.

The council was re-elected as follows:—Albert E. Murray (hon. sec.), S. Symes, J. J. O'Callaghan, J. R. Carroll, George C. Ashlin Thos. Drew, Charles Geoghegan, James H. Owen, William Mitchell, T. N. Deane, and J. J. Robinson.

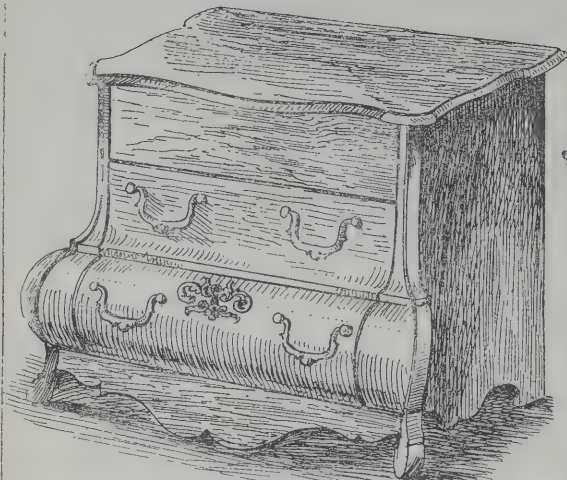
## COMPETITIONS.

BERLIN.—Some time ago the Empress Augusta, in conjunction with the German Society of the Red Cross, offered a prize of £300 for designs and models of a portable military hospital. It was intended that an award should be made last September in connection with the Brussels International Exhibition; but at that time and place no satisfactory exhibits were offered. In consequence, the Empress has decided to make the prize £500, and in June, 1889, an exhibition is to be held at Berlin, in which all countries are invited to take part, and at which all the competing arrangements will be shown. It has also been decided to give prizes for sections of the whole set of appliances.

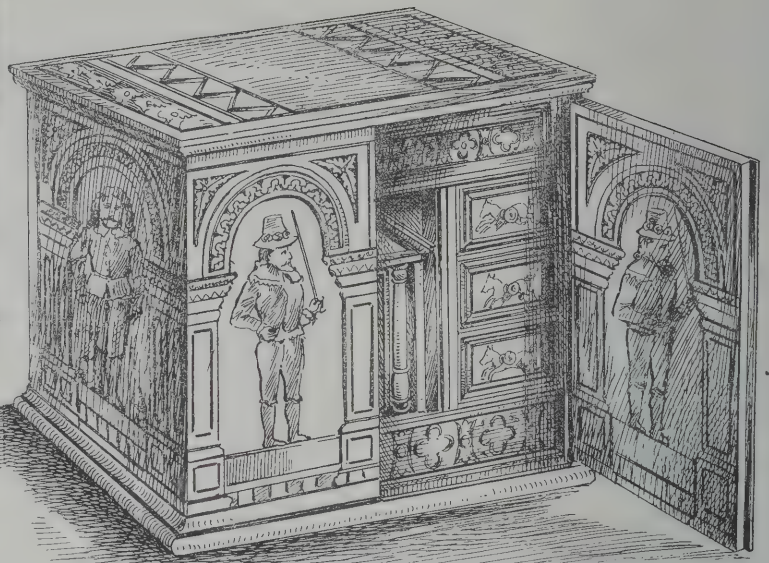
The new statue of the Duke of Wellington at Hyde Park Corner, the work of Mr. E. J. Boehm, R.A., was unveiled by the Prince of Wales on Friday. The massive polished red granite pedestal on which the statue, which is of bronze, stands, was supplied from their Peterhead quarries by Messrs. MacDonald and Co., of Aberdeen and London. The pedestal is 14ft. in height, and built up of very large blocks of uniform colour, and is surrounded by a broad mosaic pavement, laid by Messrs. Burke and Co., of Newman-street, W.

Plans from the office of Mr. James Hicks, architect, Redruth, have been adopted by the Camborne Burial Board for their new cemetery chapel and grounds.

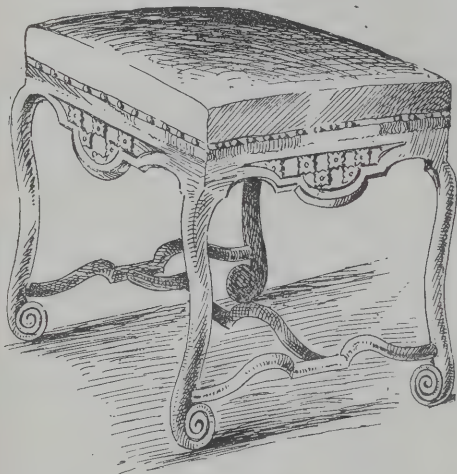




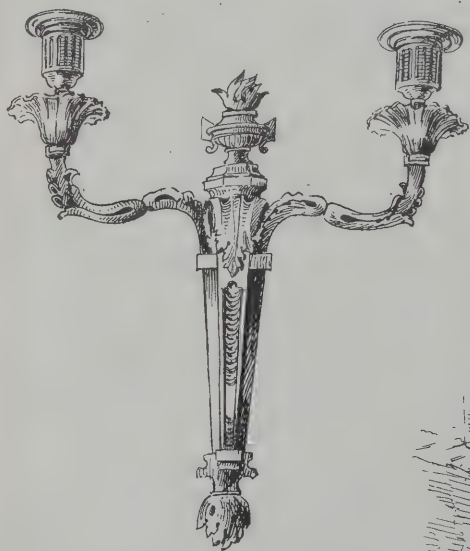
MINIATURE CHEST OF DRAWERS



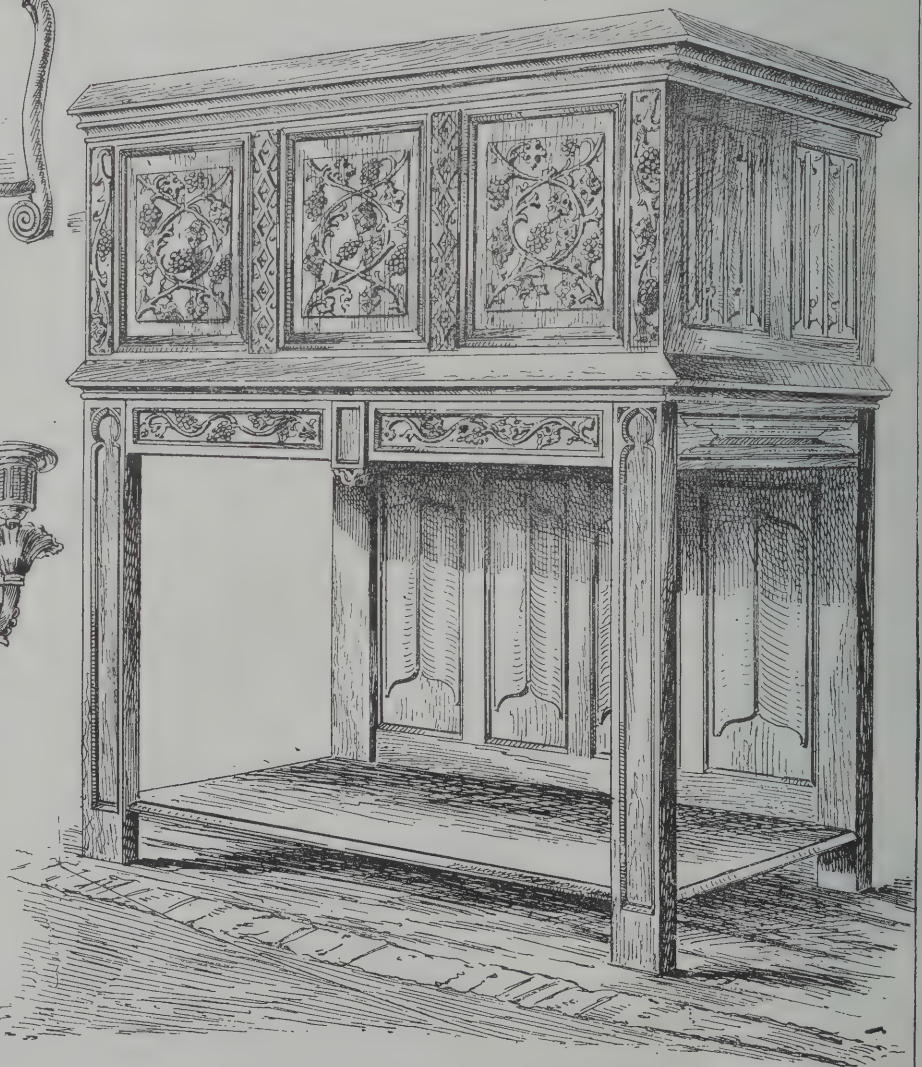
ANTIQUE DUTCH CABINET



FRENCH STOOL



EMPIRE CANDELABRA



OLD ENGLISH CABINET

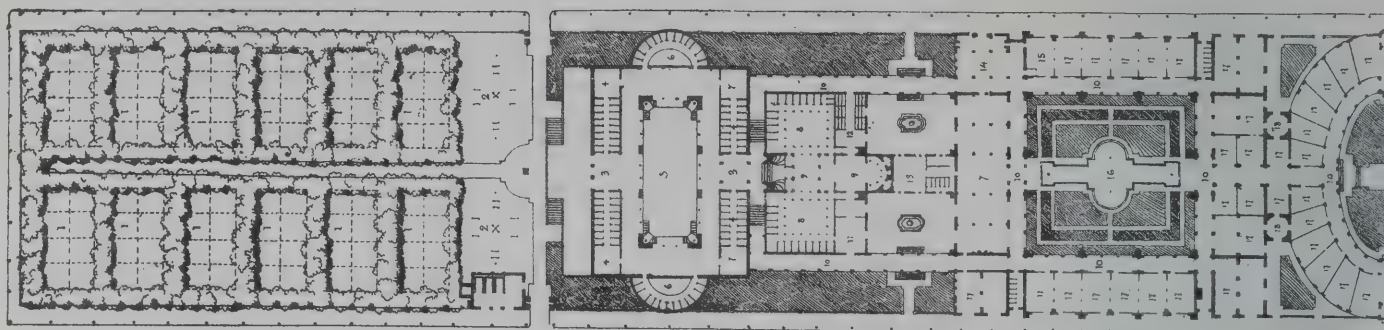
H. G. G. G. G.

AT THE SALE ROOMS SKETCHES AT A RECENT SALE AT MESS<sup>RS</sup> FOSTERS

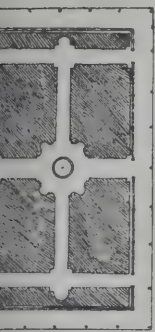












ALCAZAR:

# THE ALCAZAR. ST. AUGUSTINE, FLORIDA.

- |                             |                  |
|-----------------------------|------------------|
| 1 TENNIS COURT.             | 10 ARCADE        |
| 2 CONQUEY COURT.            | 11 MASSAGE ROOM  |
| 3 VESTIBULE.                | 12 RUSSIAN BATH  |
| 4 DRESSING ROOM.            | 13 SMOKING ROOM. |
| 5 SALT WATER SWIMMING BATH. | 14 OFFICE HALL.  |
| 6 JULIEN'S BATH.            | 15 BAGGAGE ROOM. |
| 7 LIVING ROOM.              | 16 FOUNTAIN.     |
| 8 LOUNGING ROOM.            | 17 TOWER.        |
| 9 TURKISH BATH.             |                  |







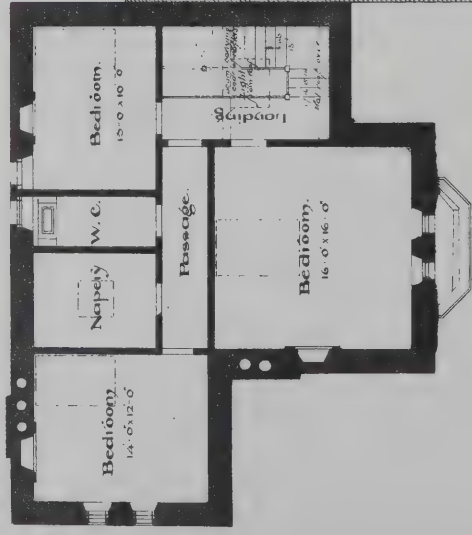




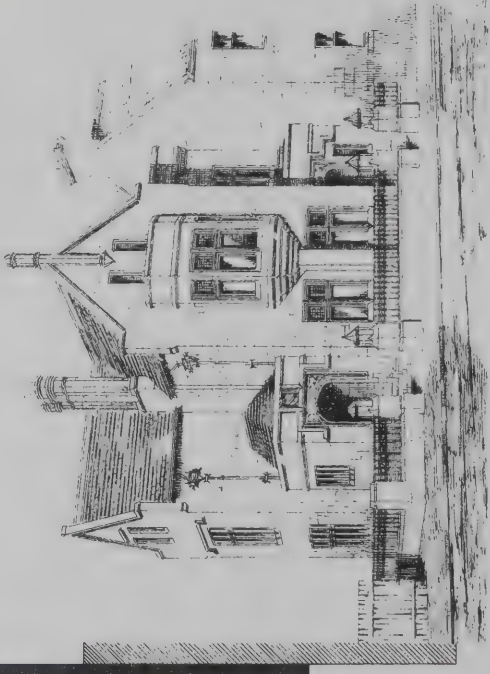


# THE BUILDING DEWS, DEC. 28, 1888.

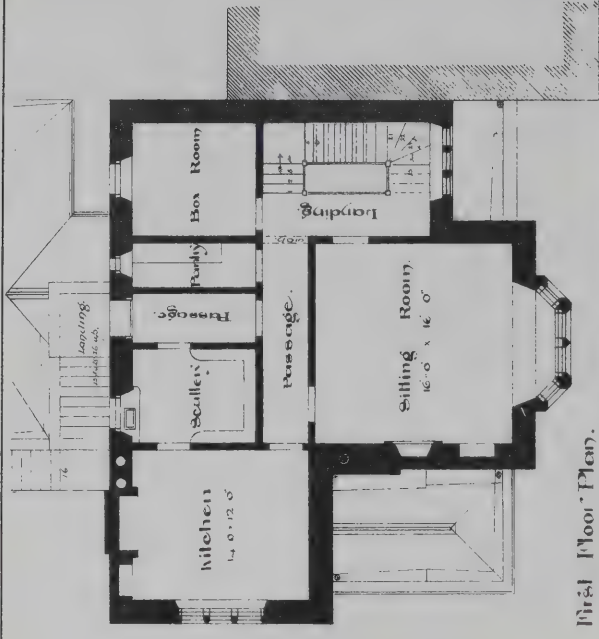
A Small Country Police Station.



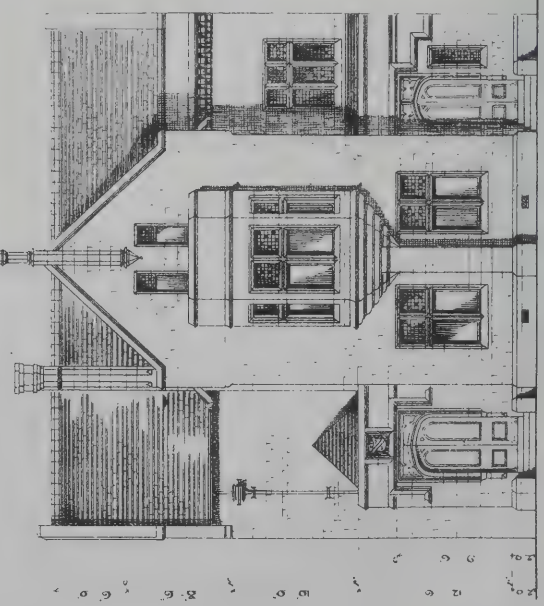
Upper Floor Plan.



Perspective Sketch.

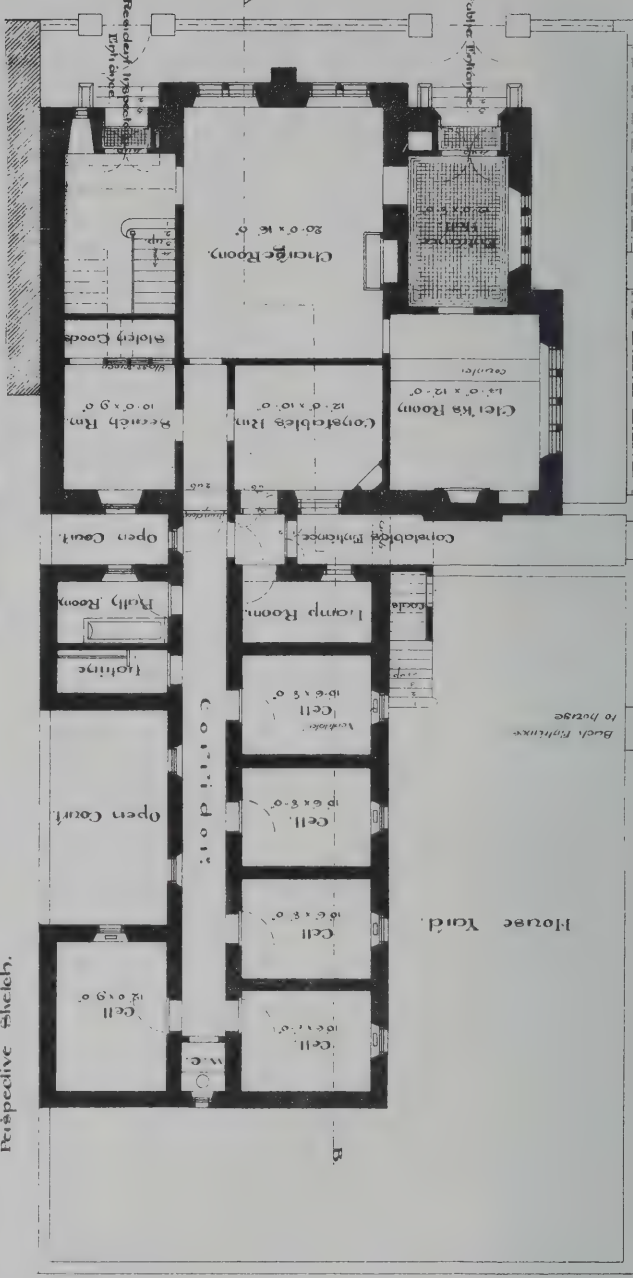


First Floor Plan.



Front Elevation.

"Building News" Designing Club.



Public Skewey

Scale of Feet.

PLACED SECOND "Unitas"

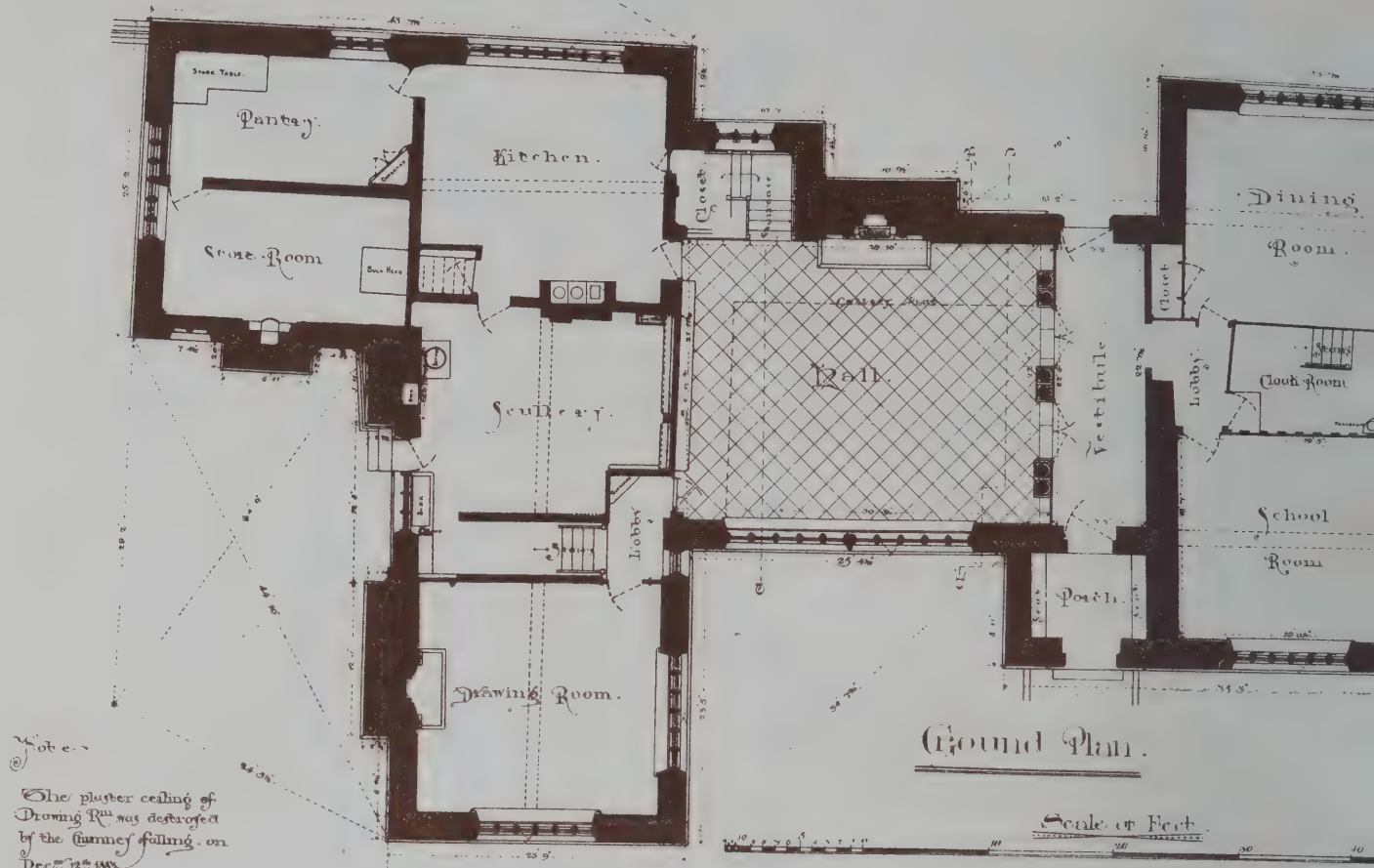






## Oakwell Hall W. Birstal.

MEASURED AND DRAWN BY  
FRED. MITCHELL  
HUDDERSFIELD



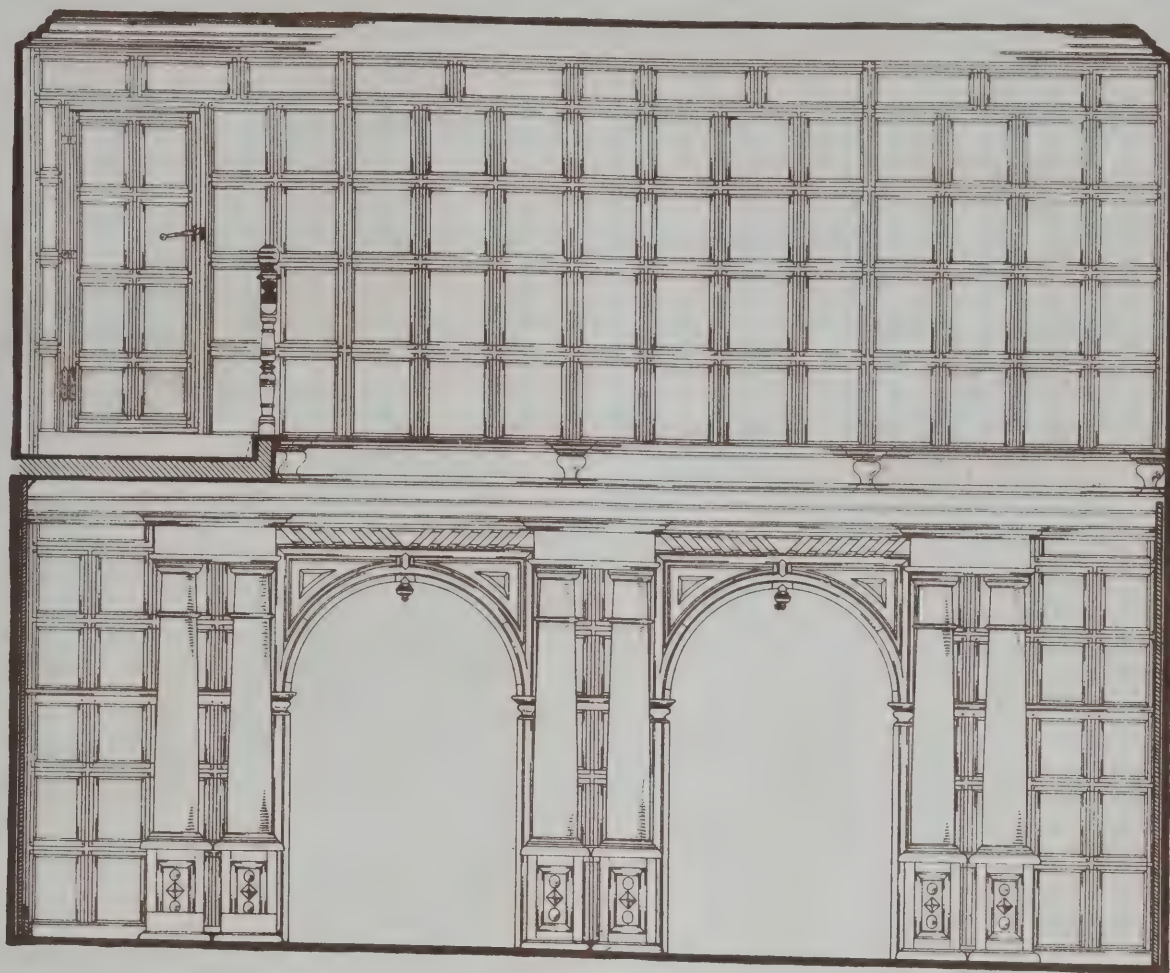
Note: The recess mould over  
panels of fireplace, see not in plan.

Elevation of N.E. side of Hall.

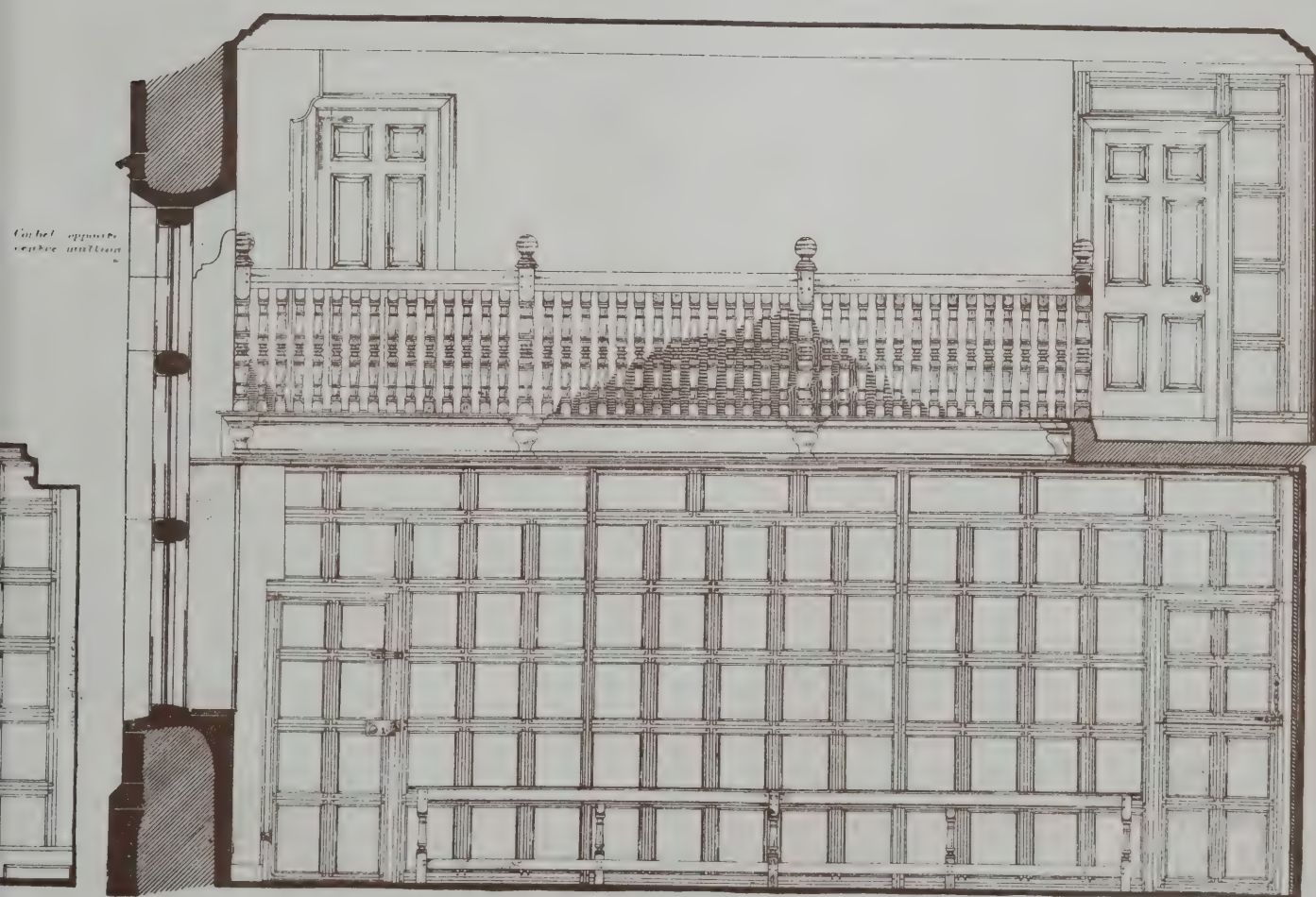
Scale of Feet.



DEC. 28. 1888.



Elevation of S.E. end of Hall.



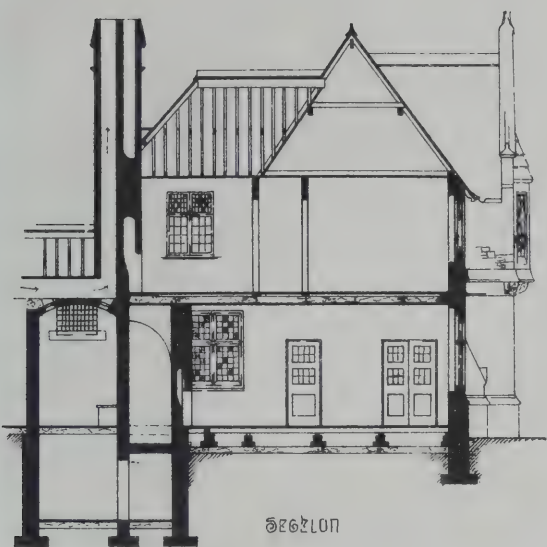
Elevation of S.W. end of Hall.







DESIGN PLACED FIRST



SECTION



Ground Plan



First Floor Plan













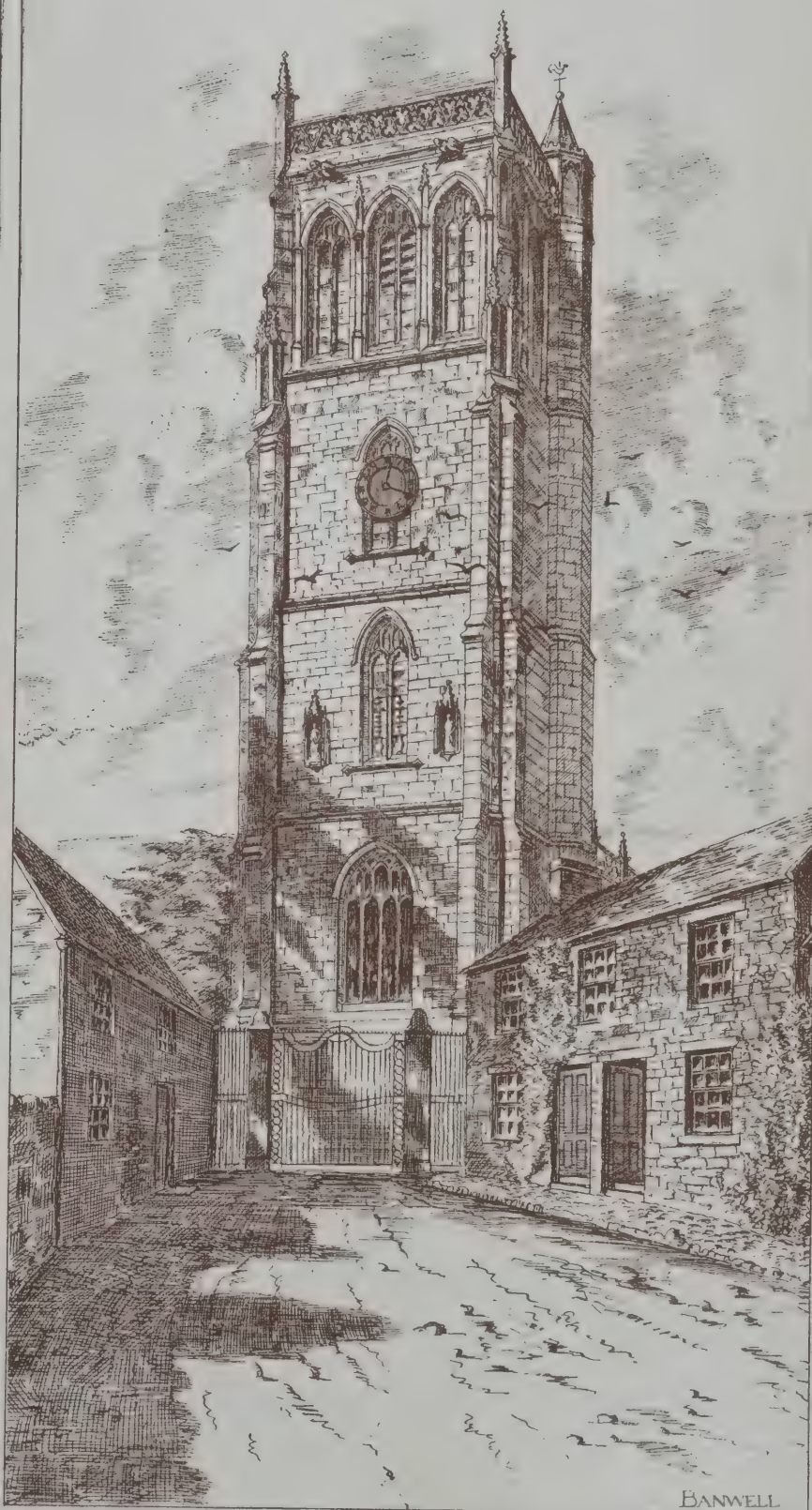


Huish · Episcopi



Evercreech





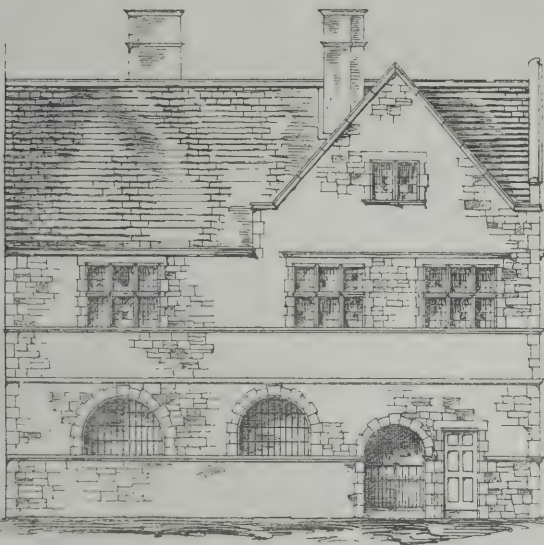
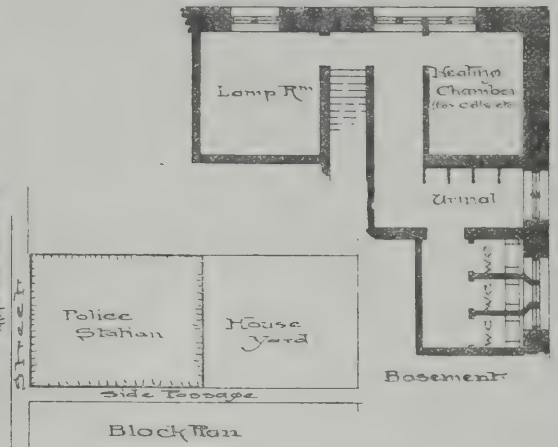
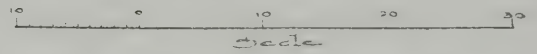




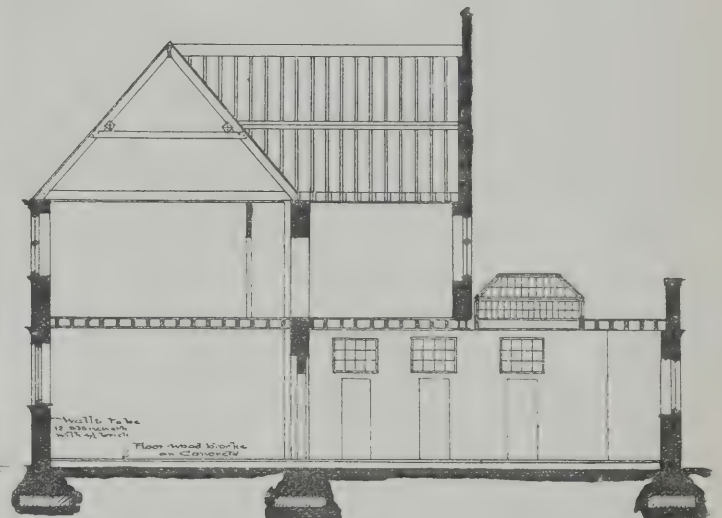




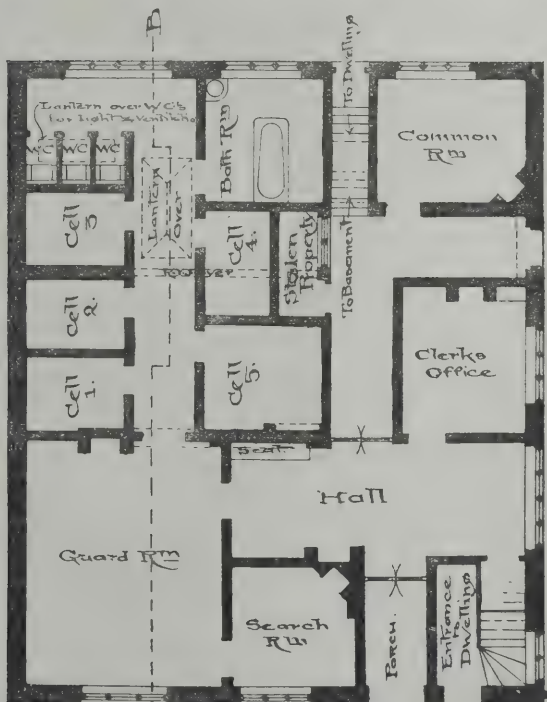
·BN·D·C·  
~ A Police Station ~  
By  
~ NEMESIS ~



Elevation

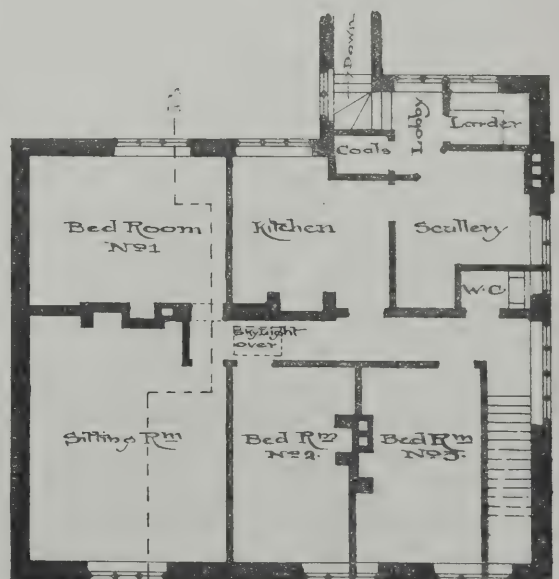


Section A-B.



Ground Plan

Placed Third



First Floor Plan.







## "BUILDING NEWS" DESIGNING CLUB.

## A POLICE-STATION FOR A SMALL COUNTRY TOWN.

THE large response by competitors for the first subject of our new series for 1888-9 has proved once more the popularity of our long-established Designing Club, and contributors send from all parts of the country to take a place in our mutual improvement class, where all can and do meet on equal terms. The following are the conditions supplied for the Police-station Competition:—

To comprise on the ground-floor a charge-room, 20ft. by 16ft., leading out of the entrance hall, which may be about 12ft. by 8ft. wide. The charge-room is to be made to communicate direct by a corridor leading to the cells, of which there are to be five, two for each sex, and one cell besides for placing more than one prisoner in should occasion require. There is to be also a search-room, 10ft. by 10ft., a bath-room, and a room for stolen property, 6ft. by 4ft. A clerk's room, 12ft. by 10ft., is to be provided, and a constables' common room, 12ft. by 10ft., or thereabouts, suitable latrines, lamp-room, &c., required. Accommodation on the first floor is to be arranged for resident inspector, reached by a private door from the street; the residence is to have a sitting-room, kitchen, scullery, &c., and three bedrooms and w.c. upstairs. A house-yard and way down to it are to be contrived. The site, which is 100ft. deep, is situated in a main street, having a frontage of 48ft., with a public sidewalk on one flank return (4ft. 6in. wide), along which lights may be obtained, and a constables' entrance to the rear of the buildings. The materials used are to be stone walling and slate roofs. Style, Late English Gothic. Scale,  $\frac{1}{4}$ th of an inch to the foot. Drawings sufficient to illustrate the design, including small perspective sketch and block plan to reduced scale.

With these particulars the merits of the plans herewith illustrated can be readily judged by our readers. We award the design marked by a "D" (in a circle) first, and place "Unitas" second. Of the chosen design for the post of honour on this occasion we may say that the elevation pleases us much more than the plans; but taking one thing with another, the composition seems best to meet the requirements of any submitted. The entrance is by way of a good square, ample lobby, wherein police notices can be posted for the information of the public. The charge-room is well lighted, and leads as it should to the clerk's office and cells beyond at the rear. The position of the usual barrier is not shown, nor is it quite clear where it could be best placed, on account of the door of the search-room; though by cutting matters rather fine, possibly it might come across in a line with the partition facing the front entrance. The fireplace in the charge-room is not in a good position, and the constables' room hardly seems so well thought about as in the plan by "Unitas." The constables' entry yard gives space for a lamp-cleaning shed, &c., and the officers' w.c.'s and urinals are reached through this disconnecting yard, which is an advantage. The heating chamber for warming the cells has been thought of, and side windows are given to the cells. The bath-room is a trifle small, but is well placed, and each cell has its own conveniences. The association cell is perhaps a little excessive in size. The clerk's office in itself is not a well-planned apartment. Upstairs the plan is not equal in merit. The kitchen need not have had the handsome oriel bay window, though there is this to be said, that probably the room might be used frequently for meals. It is not quite sufficiently shown how the stairs and entrance from the yard steps are worked in. The bulk-head, too, would very much lessen the space available for use in the pantry. There is no sink in the scullery. The bedrooms are not satisfactory, and the awkward way in which the front bedroom is reached by slicing off a corner of the sitting-room must be unreservedly condemned. The w.c. should have had a ventilated lobby to isolate it from the living-rooms. The entrance to the house, though possibly open to the remark of being cramped, is not either unduly important nor inconveniently small. The relative proportions of the two doors outside are admirable, and the general notion of the front is suitable and pretty. "Unitas" is more commonplace,

but, at the same time, is in some respects more practical. His plan, generally speaking, is very good, and the clerk's room commands the entrance and, at the same time, gives good room for a counter and desks. The doors do not open happily to the front, though we notice that spring doors are evidently intended. We mean that the right-hand door so placed must necessarily be in the way on going into the charge-room. The last-named apartment is very good indeed, and the search-room is in the right place. The bathroom is too small, and the bath should be in the centre, so that troublesome varlets may be readily washed and cleaned before being lodged in the cells. The absence of w.c.'s for the officials is an oversight, and this accommodation to each cell is omitted. The w.c. at the end of the cell corridor is very bad, and the little inner area courts should have had doors leading into them. The first floor is very convenient and nicely designed, though the w.c. difficulty is got over by the ready expedient of putting it on an upper floor. This second floor greatly simplifies the planning of the inspector's house, and permits of a more roomy arrangement. The drawings fully explain items of detail. We have nothing particularly to complain of in the elevation save that it looks too much like a private house. We place the design by "Nemesis" third; indeed, had we considered the matter exclusively as a question of exterior elevation, this composition certainly would have taken a higher place, for in this respect its simplicity of general idea meets with our warm approbation. In detail, though, "Nemesis" has much to learn, for what could be more unsatisfactory than the juxtaposition of two such very different entrance doorways as those in his main front? To put the house door immediately next the police-station entry is anyhow an objectionable arrangement, and architecturally it is evident that the principal entrance for public purposes ought to be emphasised by a very much smaller doorway along side of it if there must be a second door, though in so small a building clearly it would be far better to keep the two entirely separate. Another objection to this design, from the same point of view, is the want of relation of the windows to the rooms they illuminate. For example, the small search-room has as important a window as the guard-room; and upstairs, in rooms Nos. 2 and 3, their disposition is far from satisfactory. As to the plan, the hall, to commence with, is out of all proportions for such a building. Fancy the line of route taken by a constable and his struggling prisoner on coming in before the charge room is reached. The search-room, too, is not conveniently placed; and the fireplace in the guard-room is awkward to a degree. The clerk's office is too isolated, and the lamproom is omitted. The common room for constables is not any too large, and the stolen-property store is exceedingly ill placed. The cells are not badly arranged, however, and the same may be said of the bathroom; but side lights to the cells are impossible, which is an objection. Top lights are not so readily protected, and in snow time the cells would be dark and miserable. The borrowed lights from the corridor are poor makeshifts. Upstairs, the kitchen, w.c., and bedrooms are so placed as not to merit, by any means, the description of an ideal arrangement. The long narrow passageway here is even worse than that obtained by "D's" plan. We illustrate the design so that our remarks may be weighed with the accompanying drawings. "Iota" ranks next, and his elevation, though less ambitious than either of the first three, is effective, and eminently suitable. The perspective does not help it somehow, and illustrates how ugly the corbels over the canted sides of the central oriel would be in reality. A plain parapet brought round over the window and a gable, perhaps, behind, would have given access to the gutter and balcony thus formed, and we think would have looked far more satisfactory. The doors and windows are right enough, except that the low sills to the charge-room render the building needlessly exposed to disturbance from outside. The plan is quite different to those already described, with the clerk's office on the other side of the entrance vestibule. The upper floor has a good way down to the house-yard, and would make a comfortable residence for an inspector. "Judge Pitman" is more striking in his design, and covers a larger area. His charge-room is

unnecessarily cut up; indeed, he puts too many doors, thus, the search-room, which is only 11ft. 6in. by 7ft., has two in it. The clerk's room bears no relation to the charge-room, and the way in which the constables' room is divided off from the rest of the premises by the L-shaped corridor wastes space. The cells are nicely planned, and so are the upper floors. "Judge Pitman" ought to do better another time, and so should "Darkey," whose design comes next in merit now. His elevation only just misses being really good, and its chief fault is that it does not look like a police-station. The two doorways are almost equal in importance, and the large windows suggest a public library. The plan is too cut up by a dark passage on both floors, and beyond the minor details of the cells the author seems not to have studied the subject sufficiently. "Nab" is another competitor of whom we shall hope for some serious work. His entrance hall, clerk's office, and charge-room are compact and well devised; but the corridors are excessive, and destroy compactness, which in any small building is of the utmost importance, especially on a limited site like this in a street. The front area protects the charge-room and constables' room windows; but if notice-boards were put up there as suggested, they would hide the light. It is not clear how the front wall above the constables' room is carried, nor is there a sufficient reason for setting the upper floor back in the way shown. The passage upstairs has no light at all. The elevation is in good style and character. The same approval is due to "Mephisto," who another time had better draw in black ink. He has not realised the requirements of a police-station, and his plan seems wasteful, covering nearly all the site from front to back. One detail will suffice as an index to his want of care. See how the two doors between the clerk's room and the charge-office and vestibule would clash, and how the front door when opened would prevent the bench in the hall from being used, while if one omitted the bench the open door would practically shut up the window. The beds are wrongly placed in the cells, and the bathroom is exceedingly small. The skylight over the house corridor is omitted in the elevation. The chimney next to the main gable comes in its place over nothing! "Myth" is the author of a plan which evidently cost considerable thought, and much care is evinced by the drawings. The entrance is very poor, and the charge room is the wrong way about. The open arched corridor in front of the cells would make them very cold, and the bathroom is as bad as it could be. The upper floor is very good, and the covered way down to the back yard is admirable. "Wallaby" is pretentious, at any rate, and gives us a square massive tower, "enough to frighten the French." His plan is strongest in the cell department, and the private entrance is not badly treated, but in other parts could scarcely be worse. We place him here only because of a certain amount of taste displayed in his elevations to which everything is sacrificed. "Shadow" has devised a very solid-looking building on the face of it, but his heavy machicolated walls on the return are magically carried on  $\frac{1}{4}$ in. partitions! The projecting clock is a feature, and the oversailing chimney is intended as an attraction, though the second-floor plan does not show how it comes in, and all flues are omitted. His sketch with the horses round a trough in the foreground should have accompanied a more serious design. "Zodiac" makes a design which looks like a middle-class school, and he puts a vast roof over it without making any use of the space thus inclosed. We do not question his architectural taste: apart from the objects of the building, indeed, his elevation is really effective, and would work out well. Not so the plan, though he has by no means scamped it; in fact, the first floor is very good indeed, but downstairs we do not like the arrangement. How the prisoner is got behind the "barrier" in the charge-room is not clear. It looks like a pen into which a culprit is to be thrust while the officials stand in front to inspect him. "Venator" puts a fanciful-looking tower over his vestibule of the ornate-villa type, yet we recognise his skill in drawing sufficiently to expect more satisfactory work from him in future. We cannot commend his plans, "Primrose" has a practical-looking front,



which the perspective distorts, and the drawing of the elevation does bare justice to. The plan bears the same want of care, and is far from successful. "Mancunium" sends a building which would pass muster as a village schoolhouse, making a great feature of the sitting-room bay window on the first floor. The plan quite fails to realise the requirements. The charge-office is treated as if it were an assembly-room, and "reclining couches" are out of place in police cells. "Yorkshire Fledgeling" draws nicely, and has a taste which should develop; but he has no correct idea of designing such a building as this. The elevation resembles a pair of town houses as much as anything, and the plan is as unlike a police-station as fancy could render. "Excelsior" has taken great care in preparing his plan, for which we give him credit; but neither plan nor elevation deserves more than a modicum of praise. "St. Tudno" runs up his façade and emphasises its elevation by thin piers and numerous vertical lines. He draws fairly well, and has a notion; but his upper windows are as much too small as his lower ones are needlessly big. He has not thought evidently how the return wall over the search-room is to be carried. There is no perspective either, as required. "Country Cousin" has a far better notion, and we shall remember his first attempt in future, when, with a less unfamiliar subject, he may, perhaps, be more successful. His plan embraces several good points, and his elevation looks like what it is—a merit of no mean order. "Moth" is too ambitious, and with shaped gables and overdone features, serves up a composition which one might mistake for a successful auctioneer's house, having his office built by the side of it. The planning is not so good as the drawings by which the design is illustrated. "Mawkeye" comes next in merit, and is more serious in his attempt to carry out instructions, giving an elevation which, if commonplace rather, is, however, not overbearing nor out of character. It is, however, over-windowed.

Want of space will prevent our remarking upon the drawings which we now reach as the second class of designs. "Jos," "Olympic," with a pretty external staircase to the house; "First Attempt," nicely drawn; "Rienzi"; "Savant," with an artistic little front, but mixed-up plan; "Elean," with inspector's private door in return front; "Jak Point," well lighted, convenient, and effective, also with side entrance. The author of this contribution will, if he works well, clearly not remain in this class long. "Spider" likewise ought to do better—a desire to be original spoils his present attempt; "Westford," "Yeo-man," "Shadow" No. 2 (Edinburgh), with a queer little turret, and odd-looking, squat dormer; "Illinois," on a series of sheets of various sizes contrary to rules; "Ichabhu," with stables in the rear; "Glyp," with the cells placed at the far end of the site; "Fairy," with a very well-designed front; "The Idea," not a bad one; and "Gotha," a rather overdone design, which completes this series.

The third order of designs may thus be classified: "Streona," "Wheesh," "Avalon," "Oak," "Stanley," "H" in a circle, "An Old Blue," "Terracotta," "Nil Desperandum," "Heironymus," "Malvolio," "Bog Oak," "Legna," "Advena," "Pecksniff," "Gradorothy," "Norwartz," "Homo," "N" in a circle, "Horse-shoe," "Tyke," "Steamhammer," "X. Y. Z.," "Jax," "Picciola," "Pecksniff" No. 2 (Birken-dale, Alloa), "Dunelm," "Perseverance," "Vir Super Hostes," "Tyro" in a circle, "Nomad," "Il Penseroso," "Westward Ho," "Artifex," "Oswald," and "Policy."

A coffee-house, erected at a cost of about £25,000, was opened at Leicester on the 20th inst., by the Duchess of Rutland. The building has been designed by Mr. Burgess, of London, and is in the French Renaissance style. The front is of stone and polished Aberdeen granite, and is situated opposite the General Post-Office. This is the twelfth house opened at Leicester.

A brass tablet has been placed in the crypt of St. Paul's Cathedral, in memory of the late Field-Marshal Lord Strathnairn. It bears a simple inscription, surrounded by a bordering of laurel leaves, and headed by the helmet and bannerets of the Royal Horse Guards, of which regiment the late field-marshal was colonel.

## Building Intelligence.

**BRIXTON, S.W.**—The Right Hon. G. Shaw-Lefevre, M.P., opened the new hall of the Brixton Liberal Club at Effra House on Tuesday week. The work has been carried out under the direction and from the designs of Mr. Douglas Young, who has been honorary surveyor to the club since its foundation four years ago. The façade is executed in malms, with red brick piers, cornices, and enrichments. There is an iron and glass roof extending from the entrance. The billiard-room for four tables, situate on the upper story, has an open-timbered roof, and is well lighted. It is approached by a wide staircase, and lavatories and other conveniences are located close by. The public hall on the ground floor is 60ft. long by 30ft. wide, and 18ft. high. It has two main entrances and four exits, and is lighted by three Wenham lamps. At the side are ladies' and gentlemen's retiring rooms, large refreshment room, and lavatories. A special feature is the polished pitch-pine floor. The cost of these buildings has been £2,000.

**CHIPPING NORTON.**—The Roman Catholic church in this town was reopened last week after extensive alterations and additions. The church is in the Classic style, having at the west end a turret with domed covering. The extensions consist of a new chapel on the south side, 31ft. by 16ft., with vaulted ceiling and two small domes, the west end of which is occupied with the baptistery and the confessional, while the east is to have an altar of the Sacred Heart. East of the chapel are two sacristies, one rebuilt and enlarged, the other new, standing between the church and presbytery, and communicating with both. Over these an organ chamber has been erected, and the organ has been much improved in re-erection. The western gallery has been lowered, furnished with a new convenient staircase, and rendered serviceable to the congregation. The nave, which with many other portions, was in a pitiable condition from the ravages of dry-rot, has been paved with wood-block paving, and the seating partially renewed and reduced throughout to a suitable form. In the presbytery there has been much improvement, mainly by a redistribution of space. The material used has been local stone with dressings; the roofs are of concrete, and the work has been carried out from the designs and under the personal superintendence of Mr. Cox, architect, of Temple-street, Birmingham, by Messrs. H. and C. Burden, of Chipping Norton.

**CLIFTON, BRISTOL.**—The council of Clifton College have decided to proceed at once with the completion of the archway and tower in the College Quadrangle, the only portion of the design still unbuilt. The plans were being prepared by the late Mr. C. F. Hansom (Hansom and Bond) up to within a few days of his death, and he took a deep interest in this approaching completion of his design. They will be carried out under the superintendence of his son, Mr. Edward J. Hansom. The head master has promised £2,000, and some of the senior assistant masters have joined him in a guarantee up to £2,000 of whatever further amount is required. The tower will contain on the first floor a council-room, opening into the museum and library, with its principal entrance on the large staircase in the east wing; a sixth form school on the ground-floor, approached by a separate spiral staircase from the open cloister, and on the third floor a museum of natural history.

**EFFINGHAM, SURREY.**—The parish church was reopened after restoration on Thursday, the 20th inst. Mr. W. J. Shearburn, of Dorking, was the architect, and Messrs. Putney Brothers, of the same town, were the builders. The chancel has been partially rebuilt and renovated; the walls, where unsound, have been taken down and rebuilt to an increased height, and a large three-light window has been inserted therein; the continuation of roof tiling, which covered the east gable of the chancel, has been cut away, and a new parapet wall built up, and coped with Bath stone, having a carved cross at the apex; the roof has been raised 3ft. The old oak rafters have been restored and liced with oak boarding, formed into panels by moulded ribs, with

shields at the intersections left for future enrichment. Minton's tiles have been used to pave the floor, and stone steps are the approach from the nave to the altar. A feature of the restoration is the addition of a new reredos, consisting of a canopied arcading in Caen stone, carved and panelled, the tracery being richly gilt in relief. Under the canopy is a central full-length figure of our Saviour, supported by the four Marys, all the figures being in alabaster. The whole of the nave has been rebuilt, with the exception of the roof, and this has been lined with oak panelling, to correspond with that in the chancel. A new tower, erected to the memory of the late Rev. J. Robinson, has been built on the site of the old one, of Bath stone faced with flint-work, in the Perpendicular style, having embattled parapet. The south aisle is an addition to the chancel, and consists of a lean-to erection. The vestry and organ-chamber are entirely new. The whole of the body of the church is seated with massive English oak benches, having traceried carved ends.

**GLOUCESTER.**—A special meeting of Provincial Grand Lodge of Gloucestershire Freemasons was held at Cheltenham on Tuesday week, Sir M. E. Hicks-Beach, Bart., M.P., Provincial Grand Master, presiding, to consider resolutions of the committee appointed at the last meeting on the subject of the decoration of the reredos in Gloucester Cathedral. The reredos was erected fifteen years ago by the Freemasons of the province at a cost of £1,300, the work being executed by the late J. F. Redfern from designs by the late Sir Gilbert Scott. It was illustrated in the BUILDING NEWS for Dec. 26, 1873; is a white stone structure, divided into three principal compartments, in which are groups of figures representing the Nativity, the Entombment, and the Ascension of our Saviour; figures of Moses, St. Peter, St. Paul, and David occupy the minor niches at the sides of these compartments; and under the canopies formed by the tabernacle work above are nine figures of angels, bearing the emblems of our Lord's passion. The cathedral authorities being desirous of decorating the interior of the niches of the reredos in order to throw the figures more into relief, and also of gilding the details of the tabernacle work, a communication on the subject was laid before the meeting of Provincial Grand Lodge at Stow-on-the-Wold in May last, and a committee was appointed to ascertain the views of the brethren of the province, and to take such action in the matter, by sanctioning the work or otherwise, as might seem to them desirable. The committee authorised as an experiment the decorating tentatively of a section of the reredos in the way proposed; and this having been done, and the work inspected, the committee approved of its effect, but decided to ask the Provincial Grand Master to relieve it of further responsibility by again referring the question to Provincial Grand Lodge. The proposal to accede to the request made for the decoration thus came forward for discussion at the meeting endorsed by the unanimous vote of the Royal Gloucestershire Lodge of Gloucester, which promised twenty-five guineas towards the cost of the work. It was proposed that the decoration of the reredos be carried out in accordance with the plan approved by the committee at a cost not exceeding £300. An amendment was proposed practically negating it. On a vote being taken, the amendment was rejected by a considerable majority, and the original resolution carried.

**IPSWICH.**—A group of girls' and infants' schools just added to the boys' board school in Bramford-road, were opened last week. The new schools consist of a rectangular block, subdivided into two large schoolrooms, one for girls, the other for infants. Attached to each main schoolroom, and divided therefrom by plate-glass screens, are three classrooms, whilst the cloak-rooms occupy a central position, flanked on either side by the entrance corridors. The general details harmonise with those of the Rose-hill schools, the only difference being the stepping up of the flooring in the main schoolrooms. The floors are laid with wood blocks. Carried round all the internal walls, 4ft. high, are glazed brick dados; above these the walls are plastered and painted, with varnished pitch pine woodwork. All the windows are fitted with double-hung sashes, constructed to admit



air at the central bar, and in each bay of the roof is a ventilation panel connected with an extracting ventilator. There are also fresh-air inlets independent of the windows. The style of the buildings is a simple form of Tudor, with mullioned and transomed windows and stepped gables, with moulded finials at the apices, all in red local bricks, red Mansfield stone sills, and weatherings to buttresses and Broseley-tiled roofs. In consequence of the decision of the Board to follow the Rose-hill pattern, they are not altogether in harmony with the boys' school built seven years ago. The architect is Mr. E. F. Bisschopp; Mr. Thomas Thwaites, of Ipswich, is the builder, and Mr. B. Bird, of the same town, executed the painting, plumbing, and gas-fitting. The contract was signed for £4,143. The schools accommodate 476 children.

#### CHIPS.

The name of George Somers Mathews, of Dorking, surveyor, appears in Friday's list of adjudications.

The Mayor of Leeds has received an intimation from Colonel North that he has decided to purchase Kirkstall Abbey and grounds from Mr. Edmund Wilson, and to make a free gift of them to the borough of Leeds.

The short line between Cogan and Barry was opened on Thursday, the 20th inst., and as it was the commencement of Barry Dock and Railway, there was considerable rejoicing at Cadoxton. The stations on the line were constructed by Messrs. Charles Shepherd and Son, of Cardiff.

The death is announced of Mr. John Brookbank, formerly architectural assistant to the borough engineer of Salford, and who afterwards became city surveyor of Norwich.

A deputation from the Corporation of Glasgow visited Edinburgh on the 20th inst. for the purpose of making themselves acquainted with the manner in which the local authority in this city deals with cases of insanitary houses, in view of a probable application being made by them for additional powers.

A public hall was handed over to trustees and presented to the town of Thornbury for the use of the inhabitants on the 20th inst. by Mr. Handel Cosham, M.P., who has purchased, borne the expenses of alterations, and furnished it throughout. The building, which was formerly the place of worship of the Wesleyans, previous to the erection of their present chapel, is situated near the High-street. It has undergone considerable alterations, carried out by Messrs. F. and G. Tucker, of John-street, Thornbury. The hall is 48ft. long and 27ft. wide, and will seat about 400 persons.

The Bishop of Llandaff laid, on Tuesday week, the memorial stone of a mission hall and school-room in connection with Maesteg Church. The dimensions of the room will be 60ft. by 25ft., and the main room will be sufficient for the accommodation of about 300 persons. The style of architecture is in accordance with the church adjoining the new building. The cost is £500, and Messrs. Halliday and Anderson are the contractors.

Plans have been prepared by Mr. J. A. Chatwin, of Birmingham, for a district church proposed to be erected at Washwood Heath, near that town.

There was placed on Friday, in the hall of the Royal College of Physicians, Queen-street, Edinburgh, a bust in marble by Mr. Charles McBride, sculptor, of the late Dr. Rutherford Haldane, who for seventeen years was the secretary of the college, and afterwards the representative of the physicians at the general medical council.

A new reredos, designed by Mr. J. G. Crowther, has been raised in St. Saviour's (Cathedral) Mission Church, Cheetham.

The new Roman Catholic Chapel at Castlebay, Barra, was opened on Christmas Eve. The chapel is intended to seat 600 people, and will cost over £2,000. Mr. Wolfe Brennan, Oban, is the architect.

The value has been declared at £162,940 12s 8d. of the personal estate of the late William Brass, of The Elms, Leigham Court-road, and of Old-street, St. Luke's, builder. His capital is to be allowed to remain in his business for a term of years, repayable by yearly instalments, and his sons, Thomas and Henry Brass, are to have the option, when each is twenty-five years old, of taking shares in the business with the testator's eldest son and partner. The residue of his property, real and personal, he leaves in trust for all his children in equal shares.

Mr. Otto Weber, the artist and animal painter, died on Sunday, at his chambers, in London, at the age of fifty-six, after a long illness.

#### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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#### ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of eight words, the first line counting as two, the minimum charge being 5s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

#### SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

#### NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XLII., XLVI., XLIX., L., LI., LII., LIII., and LIV. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—S. N.—S. E.—W. H. S.—H. and Co.—T. B. B.—S. and Co.—H. G.—E. K.—O. L. B.

M. (1. The by-law prescribed by the Local Government Board provides that if the height comprises more than two stories, and the wall exceed 30ft. in length, it is to be 13½in. thick below the topmost story, and 9in. thick for the rest of its height. 2. The whole height of wall is by this by-law intended to be 14in. thick in a building of the section shown. The "topmost story" is the attic, according to the interpretation of terms; but the by-law is open to another meaning.)—J. T. (We are afraid they are losing ground; money is much scarcer than of old.)—J. B. (Not at all—where could you find a better man than Mr. Waterhouse, every way? It is our opinion that its really good last few Presidents have saved the Institute, in spite of the official red-tapeism in which it is swathed. Of course, the good men will gradually get fewer.)—THEORY. (Either of the methods shown would secure the ends of the wall-plate. We are inclined to give preference to the first method shown, in which the iron tie passes over the plate and clips it at its upper edge. Another plan is to return the plate a little way along the gable wall.)

#### "BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"Fairy," "Malvolio," "Danelm," "Il Penseroso," "Myth," "Mephisto," "X. Y. Z," "Perseverance," "Westward Ho," "The Idea," "Perpendicular," "Midland," "Darkey," "St. Dunstan."

## Correspondence.

#### REAL OLD IRISH.

To the Editor of the BUILDING NEWS.

SIR,—Talk about the "canny Scotch,"—they are not in it with our Irish brethren in the matter of competitions. When they want a design in the "ould island," they never trouble the papers with advertisements; they post the walls with bills like this:—

WATERFORD UNION.—Notice to Architects, &c.—The Board of Guardians are desirous of receiving a plan and specification for an hospital building at the workhouse, 100ft. long and 18ft. wide, on the following conditions:—1. The plans and specification are to be forwarded to me on or before Wednesday, 3rd January, 1889. 2. A statement of the architect's fee for the plan, &c., to be sent at the same time. 3. The approved plan, &c., only will be paid for. 4. The guardians do not bind themselves to accept any of the plans, &c. which may be submitted. The site of the proposed building will be pointed out by the master of the workhouse.—By order, J. MACKAY, Clerk of Union, Board Room, Workhouse, 18th Dec., 1888.

Duly note clause 2, ye venturesome architects, and make the figure low for these pauper Paddies, for whom you are requested to cudgel your brains while yet clouded by the Christmas feast such fat jobs make possible.—I am, &c.,  
ACROSS THE CHANNEL.

#### MORE COMPETITION PLUMS.

SIR,—The gentleman whose letter, under the *nom de plume* of "E. E.," appeared in your last issue, evidently knew little of the competition at Walton-on-the-Naze, or he would have written about it in a very different strain. The prize of £20, which has been offered to the competitor who may be chosen to make plans and estimate for a short piece of sea walling and a small stone groyne, is an exceedingly liberal allowance for the work specified, especially as there are good plans of the site in existence to which the engineer would have access; but his payment will, in all probability, by no means end there. Before the work can be carried out Parliamentary powers must be sought, and the engineer, once appointed, would naturally have to see the matter through, and would become entitled to the usual Parliamentary fees. In addition to this, he would probably be asked to carry out the work himself at his own estimate, and as engineers have no foolish scruples against undertaking contracts, he would here again have an opportunity of making a little money. That the work will be carried out is a moral certainty, for the sea front of the town is rapidly disappearing for want of the contemplated defence works, the necessity for the immediate construction of which is well recognised by the inhabitants.—I am, &c.,  
EAST ANGLIAN.

#### COURTS OF JUSTICE COMPETITION.—CITY OF YORK.

SIR,—We inclose the conditions in this, together with copy of letter we have addressed to the town clerk, on closing a correspondence in the matter relating to the appointment of an architect assessor, and the exclusion of perspective views and colour upon the drawings.—We are, &c.,  
LEEMING AND LEEMING.  
Victoria House, 111, Victoria-street,  
Westminster, Dec. 22nd.

#### [COPY.]

#### PUBLIC COURTS COMPETITION—CITY OF YORK.

DEAR SIR,—We thank you for your note and further particulars in this matter to hand this morning.

We regret, however, that the conditions totally preclude our competing, and we may add further that, in our opinion, it is scarcely likely that any architect of repute will submit a design.—Thanking you for your courtesy, we are, yours truly,  
(Signed)  
G. McGuire, Esq., Town Clerk, City of York.

[We do not see that any other course was open to Messrs. Leeming and Leeming in view of the following clause in the conditions:—

1. The Municipal Offices Committee of the Corporation do not propose to appoint a professional Assessor other than their own City Surveyor, Mr. E. G. Mawbey, A.M.I.C.E., who will assist them in the selection of suitable designs.

(Mr. Mawbey has had considerable architectural experience, has recently completed certain alterations of the theatre in the City, and the Corporation have agreed to carry out his plan for the erection of new Municipal Offices adjoining the Guildhall.)

Mr. Mawbey's position is doubtless a sufficient guarantee of his ability and *bona fides*, but it is certainly undesirable that the sole referee in an important municipal competition should be the servant of the corporation.—ED. "B. N."]

#### DARTMOUTH CHURCH RESTORATION.

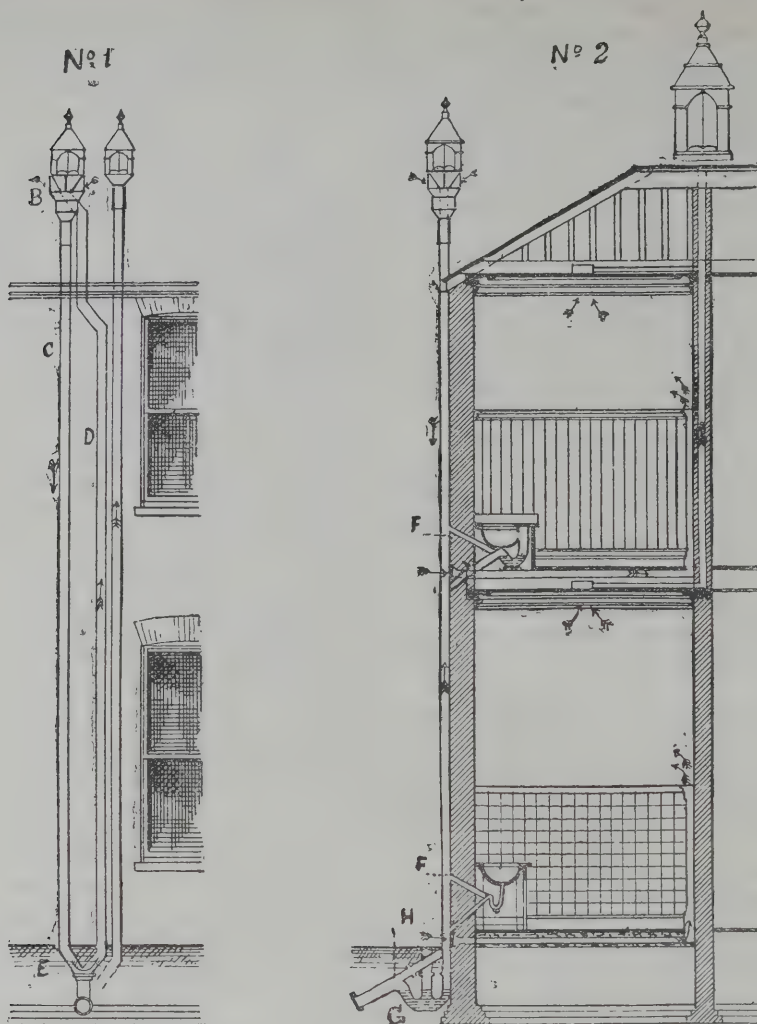
SIR,—In the account you gave of the Dartmouth Church restoration there are two or three items want correction. The work was to be confined to the chancel, chancel aisles, and vestry. During the progress further work in the renewal of 53ft. of the roofs of the nave and aisles and transepts was undertaken. Three new windows in the chancel and the seats and floors are from Mr. Sedding's designs. The western portion of the church greatly needs repair when funds can be raised.—I am, &c.,  
Dec. 22.

OBSERVER.

#### GORTON BATHS COMPETITION.

SIR,—Will you allow me through the medium of your paper to inquire if anything has been heard of the result of the public baths competition, Gorton, advertised in August, designs to





be sent in by September 15? I think it a long while to elapse without any announcement being made. I inclose my card, and remain,—  
Yours, &c.,  
A COMPETITOR.

#### DISCONNECTING WATER-CLOSETS.

SIR,—As we observe that "Clerk of Works" expressed a desire to see illustrated the system of soil-pipe disconnection and ventilation advocated by Mr. Goodridge, we think that the accompanying diagrams, which represent our "double-action system of soil-pipe ventilation" will sufficiently explain what, as we understand it, Mr. Goodridge is trying to make clear. We may mention that our experience of this system has been perfectly satisfactory.

*Diagram No. 1.—Elevation of Double-Action System.*—With this system a double power is obtained, the exhausting force of the latest improved self-acting air-pump ventilator A, applied to the up-cast pipe D, creating a strong upward current; whilst the pressure of the external air upon the down-cast ventilator B, which catches the wind from any quarter, causes it to pass down with considerable velocity the soil-pipe C, creating a through current at the junction E, immediately above the trap in the direction indicated by the arrows. The air inlet being above the roof, there is not the same danger from escaping noxious gases, allowing such a thing to be possible, as, when the inlet is at, or a little above, the ground level. H, separate ventilating pipe connected with drain.

*Diagram No. 2.*—F F, 2in. pipes connected with soil-pipe to ventilate waste-pipes and prevent siphoning of traps; G, drain trap.

This system can never get out of order, having no movable parts liable to corrosion from the action of the gases or moist air passing through the pipes, and it costs very little more than the old-fashioned method.—We are, &c., ROBT. BOYLE AND SON (Limited), Ventilating Engineers, 64, Holborn-viaduct, London, Dec. 21.

SIR,—From the way in which Mr. Alfred S.

Goodridge writes upon this subject on p. 796, it appears to me that he has either written hastily, or, judging by what he has written, he does not understand the matter properly. In order to show how I differ from him, I will place his way and mine, or my criticisms on his, in parallel lines:—

#### A. S. GOODRIDGE'S PROS.

1. The cutting off by a water-trap each closet from the house-drain and other fittings, so diminishing the possibility of communication of poisonous gases and germs.

2. The passage of the air through the soil-pipe, if it is arranged as a downcast with a separate upcast, is quicker, especially during the use of the closet.

3. The necessity of any traps to valve apparatuses is thereby removed, the draught being away from the fitting.

#### W. P. BUCHAN'S PROS AND COMMENTS.

1. I agree with this, only I suppose he means the cutting-off of each soil-pipe separately.

2. This allows the soil-pipe to be ventilated with fresh-air. In many cases a separate upcast air-pipe is a pure waste of money, and if the soil-pipes were inside of the house and this upcast pipe outside, said "up-cast" pipe, except at the moment of flushing w.c., would generally be a downcast pipe. There is no necessity—except as a preventive of siphon action—for a quick passage of air through the soil-pipe. In towns, this simply poisons the atmosphere unnecessarily.

3. Mr. Goodridge's 3rd "pro" is a mistake, as people soon discover when the water is off, or the valve does not shut tightly.

#### A. S. GOODRIDGE'S CONS.

1. Interference with a free and unobstructed air circulation throughout the whole system, the outside of each closet trap being a *cul de sac* for stagnant foul air, unless another upcast pipe is put, which usually is not done, and would involve some difficulty in many cases.

2. The extra security from the trap is very questionable over the one-trap principle if the pipes are all arranged properly, and a water seal under pressure is not reliable unless ventilated on the off side.

3. If all foul pipes are downcast, which they should be, with back air pipes, and separate upcast pipes having no fittings on them, any gases would be carried in the direction of the current to the up-cast pipe, and that without any interruption by the action of fittings, but they would assist it.

4. The whole system being in this way perfectly ventilated—on each section—with one intercepting trap, is not the passage of air throughout its whole length more reliable to prevent gases than the water seal dividing it up in order to keep them out?

5. The increase of pipes and traps to closets (sometimes a large number), with often the difficulty of arranging them, and in an architectural building their unsightly appearance may be raised as an objection.

6. The extra cost, which ordinarily in sanitary matters is a crucial one, would be against it.

7. The loss of flushing power in the drain and in passing the

#### W. P. BUCHAN'S COMMENTS ON CONS.

1. The interference is imaginary as to necessary fresh air circulation, and we do not want stinking air from the whole of the drains to get access to and up every soil-pipe if we can help it, any more than we want to give thieves free scope through our houses.

2. The extra security from the disconnecting trap at foot of the soil-pipe is beyond question. I don't understand what he means by the last sentence. It may have some sense in it, but, if so, it requires to be pointed out.

3. I published this "down-cast" idea of the air and water both going the same way in 1883; but, in many cases, it would be very difficult to do it and needlessly expensive. See page 310 of the new (fifth) edition of my book on "Plumbing." Nature causes man to both inhale and expire by his mouth—or nose; but Mr. Goodridge would insist upon all the expiration being carried on elsewhere. To object against the momentary interruption of soil-pipe ventilation by the water-flushing is mere pragmatic fastidiousness.

4. Soil-pipes and drains of houses should be ventilated in the way that is safest for the inmates, and the water seal of a good trap is a better protection against gases and disease germs than all the ventilation in the world. Ventilation as recommended by Mr. Goodridge is manufacturing an evil, if he had only the sense to know.

5. What increase of pipes does Mr. G. mean? Ventilating-pipes are needed even for the "non-trapped closets," in order to prevent their overflow trap from being siphoned, and also for ventilation to prevent corrosion of the lead, and the formation of the "cul de sac" Mr. G. objected to in his first "cons."

6. The extra safety over-rules the extra cost with many in my experience, and isolation—in which lies safety—has to be paid for. People find it is cheaper to pay the plumber an extra half-crown to-day than the doctor a pound to-morrow.

7. All this is fanciful. Mr. G. should next advocate the dis-



second trap, from the principal fittings, by the break of the extra trap as well as the greater liability of obstruction.

8. The getting rid of traps to valve apparatus with a down-cast soil-pipe may be just as safely done with or without the extra trap, the current being the same in either case.

8. It is not safe to fit up a valve-closet without a water-trap closet below it, as when a piece of paper sticks in the valve and keeps it open, then foul air may blow freely into the house, which foul

air will be all the fouler if it comes from the drain as well as from the soil-pipe. This style of fitting up closets without a water-trap may be called the "heir's friend" or the legal poisoning style of fitting closets—e.g., a piece of folded-up paper is slipped in under the valve-seat to keep valve open; then the heir, if a child, may be caused to breathe the foul air coming up and so poisoned. This aid-to-crime style of doing sanitary work ought to be prohibited, and neither architects nor engineers who do not understand how to do plumbers' work properly ought to be allowed "to determine" for themselves what to prefer. What is the use of the cry for the Registration of properly qualified plumbers if they are to be forced to do bad work to the order of ignorant architects, who are too conceited to take advice? While as to "engineers," a man with about as much real knowledge of plumber's work as he has of Hebrew may style himself a "Sanitary Engineer," should he simply buy a smoke-testing machine.—I am, &c., W. P. BUCHAN.

Glasgow, Dec. 22nd.

## Intercommunication.

### QUESTIONS.

[1872].—**Legal**.—Builder enters into agreement and signs it, specification, and plans, for erection of houses. After works commenced architects discover houses encroach over a building line, and fresh plans, altering slightly, and setting back the houses, are sent by architects to builder, who has to undo and recommence. These substituted plans not signed. Are all former signed plans, agreement, and specification void?—VICTIM.

[1873].—**Bridges**.—Would some one kindly oblige by answering, in your valuable paper, the following questions:—Total length of bridges, span bottom piers, width of rivers, height above river to roadway of Tay Bridge and Clifton Bridge; longest bridge in London, width of river; Victoria Bridge, Canada; Brooklyn Bridge, New York, and Niagara Bridge?—A FOUR YEARS' SUBSCRIBER.

[1874].—**Reservoir**.—I should be glad if some reader will give the correct way of taking out areas of, say, a reservoir or an irregular piece of land, thus. There is one



method of making the curved lines straight, by Euclid, before commencing to take out the content. I shall esteem an answer on the subject a great favour.—O. P. R.

[1875].—**St. James's Hall**.—I understand this hall is considered a good one for sound. What are its dimensions, form of orchestra, and roof?—S. S.

[1876].—**Attic**.—Is an attic wholly in the roof considered a story? If so, the by-laws under the Public Health Act are not very explicit, as an ordinary two-story house would in that case require a thicker wall than shown for it in the schedule.—PROVINCIAL.

[1877].—**Draughtsman's Civil Service Exam.**—What are the best books to study for Civil Service examination for draughtsmen, particularly with reference to price of materials, estimating cost of buildings, &c.?—YEOMAN.

A new well for water supply is being sunk at Richmond, Surrey, for the local board, the site being at Terrace Gardens. The interior is lined with brickwork, and has now reached a depth of 188ft., and has a diameter of 9ft. 6in. in the clear. Mr. William G. Pearce, C.E., is the engineer, and Mr. E. Timmins, of Runcorn, the contractor.

The new Constitutional Club at Scarborough, opened on Thursday, the 20th inst., by the Marquis of Salisbury, has been built from designs by Mr. H. A. Cheers, of Twickenham, selected in competition. The club, which is French Renaissance in style, was illustrated by a perspective and two plans in the BUILDING NEWS of Oct. 28, 1887.

### LEGAL INTELLIGENCE.

**RIGHT OF LATERAL SUPPORT.**—**KNOWLES V. QUEEN ANNE AND GARDEN MANSIONS, LIMITED.**—(Before Mr. Justice Stirling, Dec. 19).—The plaintiff was the owner of the lease of a house called Queen Anne's Lodge, situated close to St. James's Park, Westminster. The principal defendants were a company owning large blocks of buildings adjacent to the plaintiff's house called respectively Queen Anne's Mansions and Garden Mansions, and owning also the fee-simple of Queen Anne's Lodge. The other defendants were the well-known contractors Messrs. Lucas and Aird. The defendant company were engaged in carrying out a scheme to extend the existing Queen Anne's Mansions by pulling down Garden Mansions and erecting new buildings of a great height. The plaintiff complained that these operations were calculated to cause, and in fact had already caused, considerable damage to his house, by depriving it of the support which it had hitherto enjoyed, and also by reason of the interference with the access of light. He, therefore, moved for an injunction to restrain the defendants, their contractors, agents, and servants from pulling down, or weakening, or interfering with the wall separating his house from the defendants' premises, or in any way depriving such wall of its present support, or making any openings in the wall or otherwise causing damage to Queen Anne's Lodge, and from erecting or continuing to erect any buildings so as to obstruct or interfere with the access of light to Queen Anne's Lodge. The case has been before the Court on several occasions; but from time to time, on the application of the parties, it has stood over. On November 26 Messrs. Lucas and Aird gave an undertaking, following upon one previously given by the other defendants, not to pull down or weaken or interfere with the wall in question. Since that date the plaintiff alleged that the contractors had, notwithstanding their undertaking, continued to carry on the building operations by excavating the soil adjacent to the plaintiff's wall, and had so brought about a settlement of the wall and caused serious cracks to appear therein. The plaintiff then moved for an order to commit the contractors for contempt of Court in breaking the undertaking, and the two motions now came on for hearing. The evidence, which consisted to a great extent of affidavits by surveyors and architects, was very conflicting; that on behalf of the defendants being to the effect that the building operations had been carried out with the utmost care, having regard to the safety of the plaintiff's house, and, in fact, that its stability had not been in any way injured; that the cracks in the wall were not of recent origin, the house being a very old one, but had probably been caused by the vibration of the trains upon the District Railway, or by some other cause. The defendants also alleged that the plaintiff had refused to allow his wall to be underpinned, and, therefore, they had been obliged to construct the foundations of their buildings in short sections, excavating the soil and filling up the holes thus made with concrete and brickwork as they went along. It appeared that, after the undertaking given by the contractors, they had, acting under the advice of an engineer whom they had consulted, continued the making of the holes and filling them up as described, their opinion being that by so doing they were not breaking the undertaking not to deprive the wall of its support. At the commencement of the case the defendants' counsel gave an undertaking as to the interference with the plaintiff's right to light, which was accepted by his counsel. The defendants also, at the suggestion of the learned Judge, agreed to give an undertaking not to make more than one hole at a time, each hole to be of a stipulated size and to be filled up as soon as excavated in the manner described. Mr. Justice Stirling, after stating the facts and alluding to the evidence, said that it was so conflicting that he should not have been prepared to decide the case upon it without some further assistance from experts. The question was whether the plaintiff was likely to suffer any serious injury, and if the defendants were restricted by the proposed undertaking it did not seem that any serious damage could accrue to the plaintiff's house; while, on the other hand, if he were to grant the injunction asked for, he might seriously hamper the defendants in the operations which they were carrying on upon their own land. Under the circumstances, he thought he ought not to make any order upon the principal motion. There was another point as to the pulling down of a cross wall, which, it was alleged, robbed the plaintiff's wall of its support. As to that, he thought the evidence was not such as to justify his interference. He had still, however, to dispose of the motion to commit the contractors for breach of their undertaking not to deprive the wall of its then present support. His Lordship considered the evidence on that point, and referred to the affidavit of the gentleman whose advice the contractors had taken, and who did not go so far as to say that what had been done after the under-

taking had had no effect upon the support of the wall, but only said that it did not deprive the wall of any support which was "in the least degree necessary" to it. That was not enough to clear the contractors. They were an eminent firm, and had filed evidence in explanation of what they had done, and stating that if they had broken the undertaking they had done it in good faith and inadvertently. His Lordship was willing to accept their statement. Nevertheless, it must be clearly understood that such undertakings were sacred and to be obeyed to the letter. Under the circumstances, therefore, he must order them to pay the costs of the motion.

**IN RE E. C. HOWELL.**—With reference to this failure, which was noticed in our last issue on page 834, we are asked by the debtor's solicitors to state that the liabilities amount to about £10,868, the estimated value of the assets being £33,000.

**UNITY OF POSSESSION IN LIGHT AND AIR CASES.**—In the Chancery Court, on Dec. 19th, before Mr. Justice Kay, the case of Dunkley v. Timberlake, came on for hearing. It was an action brought by Mr. Dunkley, chemist, of High-street, Tunbridge Wells, to restrain Mr. Timberlake, bicycle manufacturer, also of High-street, from obstructing, by a building which defendant had erected on a piece of land in his occupation, adjoining a stable belonging to plaintiff, the access of light and air to a window in such stable. It was alleged on the part of the plaintiff, that the building which Mr. Timberlake had erected blocked up and entirely obstructed the window in Mr. Dunkley's stable. The whole of the property formerly belonged to Mr. Horatio Stephens, who some years ago granted a lease of that portion occupied by defendant to another person. After the granting of the lease to Mr. Richardson, Mr. Stephens sold to Mr. Dunkley the stable in which was the window in question, and which had been blocked up by defendant. Witnesses were in attendance on behalf of plaintiff to prove that the window had existed for more than 20 years, and that it had been wholly obstructed by defendant's building. This was not disputed on the part of the defendant, who contended, however, that inasmuch as the whole of the property had belonged to Mr. Stephens, the window in question was not an ancient light, there having been a unity of possession of the whole of the property. After hearing the argument adduced on behalf of Mr. Dunkley, Mr. Justice Kay did not think it necessary to call upon the defendant's counsel, as he held that the contention set up on his behalf was, on the authority of the case of Wheeldon v. Burrows, well founded, and he therefore dismissed the action with costs, to be paid by the plaintiff.

### CHIPS.

The new police-station in King-street, Watford, was first used on Wednesday week. It affords house accommodation for the superintendent, a sergeant, the superintendent's clerk, and two constables, together with cell accommodation and an exercise yard. There are an office and ante-rooms for the police, together with stabling for the chief officer's horse. The work has been executed from the plans and specifications of the county surveyor (Mr. Urban Smith, Hertford) by Messrs. Dupont and Co., builders, Colchester, the total cost being about £7,000. Mr. Franklin, of Hertford, was the clerk of works.

An infant school has been lately erected for the parish of All Saints at Emscote, Warwickshire. It is a half-timber building in the style of the 16th century. The architect was Mr. J. Cundall, of Leamington, and Mr. Ayres, of Warwick, was the builder.

The erection, or adaptation of existing premises for "Cheap Food and Shelter Depots" in different parts of London for the Salvation Army is being rapidly pushed forward. A contract amounting to £750 for one at Burne-street, Edgware-road, has just been secured by Mr. A. Martin, builder, of Battersea. Plans are in preparation for two in Whitechapel, and one in Clerkenwell. Mr. J. Williams Dunford, of 101, Queen Victoria-street is the architect.

Mr. E. H. Shorland, of Manchester and London, has just supplied his patent Manchester stoves to warm and ventilate the new ward of the Grantham Hospital, Mr. R. Adolphus Caine, M.I.B.A., of London, being the architect.

An inquest was held at the Assembly Rooms, Westgate-on-Sea, on Monday, touching the death of William Frostick, builder and contractor, who, while out riding in the parish of Acol on Saturday, fell from his horse and died. Medical evidence showed that death resulted from apoplexy, and the jury returned a verdict in accordance therewith.

The pinnacle of the north-west tower of the west front of Peterboro' Cathedral, which was blown down during the recent gales, has been replaced.



## Our Office Table.

THOSE who have weak points on their roofs, lead or zinc flats, and gutters should now take the timely precaution of seeing that the slates and lead are in a good state of efficiency, and that the pipes and gutters for the discharge of water are clear. If a snowfall should come, these preparations will be found to avail much, but somehow or another they are overlooked, and the consequences of a thaw unforeseen. Many of the leakages through roofs occur below the gutter between the slope of roof and blocking course, owing to the lead not extending far enough up the roof. The gutter is choked more or less, and the water-level in the gutter rises and finds its way over the edge of the sheet of lead. The lead should extend up the roof sufficiently high to allow for a swollen gutter. If builders and architects would only think of "overflows" through parapets, the risk of the water rising and escaping over the lead sheet would be greatly diminished.

THE use of the electric light is now very largely adopted in carrying on building operations during the night. At the works at the Tivoli in the Strand, and in one or two new buildings being erected on the north side of Piccadilly-circus, the men have been able to work night and day. The arc lamp system is of course desirable. The use of this illuminant has made a revolution in the terms of completion of contracts, and will become even more an item of competition work in the future. Contractors will be able to nearly double the time at their disposal by this means. Of results we are less certain, as scamping can go on with less chance of detection. We are not quite sure how architects take to the practice.

MR. JAMES BEVERIDGE, the general secretary, issued on Monday the twenty-seventh annual report of the Associated Carpenters and Joiners. The report states that the improvement in trade has more than realised expectations. The income for the year amounts to £6,155 6s. 6½d., or an increase of £214 13s. 8d. over the income of the previous year. The gross expenditure for the year amounts to £6,324 15s. 0½d., or a loss of £169 8s. 6d. on the year's transactions, thereby reducing the funds in hand to £8,169 18s. 2d., which, on a membership of 3,833, makes the Association worth £2 2s. 7½d. per member, or 4½d. less per member than last year. Of this sum £5,231 2s. 4½d. belongs to the trade fund, £2,660 6s. 9½d. to the sick, and £278 9s. to the idle fund, being a gain of £31 17s. 7d. to the trade, a loss of £388 1s. to the sick, and a gain of £186 14s. 11d. to the idle fund. The return of plant held by the Association, exclusive of books, &c., is estimated at £309 6s. 8½d., making the total worth of the Association £8,479 4s. 10½d. Mr. Beveridge concludes:—"While we cannot congratulate you upon any increase in our membership or funds, we can compliment you upon the amount of good which we have been able to accomplish during the year both in relation to the protection and advancement of our trade interests, and the relief we have been able to bestow upon our sick and suffering brethren. Now that there is every prospect of trade reviving, it behoves us all to make a more earnest endeavour to enlarge the basis and increase the usefulness of our organisation."

OUR American cousins, with all their ingenuity and inventive talent as engineers and mechanics, fall short in some details of practice. Take, for example, the rail fastenings in use on American lines of railroad. The rails are held down only by spikes, which soon loosen and fail to hold, hence the frequent spreading and overturning of the rails. In England every line of rails is secured not only by chairs spiked to the ties, but wooden keys are driven horizontally between the web of rail and the jaw of the chair. The keys are driven in the direction of the traffic. The side fish plates and bolts at the joints of rails, and the greater frequency of cross ties at the ends of rails, and the wood cushion under the rail are all essential points in the safety and ease of our permanent ways. "The proof of the pudding is in the eating." The English railways do not give the trouble that the American tracks do, and this is attributed by one American engineer to the security of the fastenings and

to the joint ties. These conclusions are the result of a careful study of English railroads made by Mr. C. E. Russell Trotman, C.E., embodied in a paper read at the annual Convention of American engineers.

At the last meeting of the Swinton and Pendlebury local board, Mr. William Joy Hewetson, who has just been appointed clerk to the Wood Green Local Board, was presented with a handsome illuminated address and a gold and diamond breast-pin, from the staff, in appreciation of his faithful and valuable services for over twelve years as clerk and adviser, and as a record of their high sense of the intelligence, tact, and general business and administrative capacity he has always shown in the many public undertakings with which he has been connected. Mr. Hewetson was also presented with a gold watch on behalf of the ratepayers, and with another address from the officers of the board past and present. Mr. Hewetson certainly comes to Wood Green with a triple record—such men are much wanted in the Metropolitan area.

MOSAIC woodwork and a method of making it form the subject of two patents recently issued to one William J. Kelley, of Pittsfield, Mass. It is a form of mosaic flooring or wainscoting made in composite strips which are arranged side by side upon the floor base or wall to delineate the desired pattern. Thin, slightly flexible sheets of soft wood are made the base, upon which are glued a series of varicoloured hardwood facing strips, the grain of successive strips being alternately crosswise of and in the direction of their length, and the whole is then sawed through on lines transverse to the length of the facing strips, making strips having a single succession of varicoloured square facing blocks. These strips are then grooved on their side edges, whereby they may be connected by longitudinal splines and conveniently fixed in position on the floor, the facing blocks being free to expand and contract in either direction.

### MEETINGS FOR THE ENSUING WEEK.

WEDNESDAY.—Society of Arts. Juvenile Lecture. "How Chemists Work," by Dr. H. E. Armstrong. 7 p.m.

FRIDAY.—Architectural Association. "London Street Architecture: as it is and as it might be," by F. Massey. 7.30 p.m.

Architectural Association, 9, Conduit-street, W.—Jan. 4. Francis Massey, Esq., on "London Street Architecture." 7.30 p.m.

### CHIPS.

Mr. Samuel Joseph Smith, C.E., one of the inspectors of the Local Government Board, held an inquiry on Friday last at the Exmouth Town Hall into the subject matter of an application made by the local board of the district of Exmouth to the Local Government Board for sanction to borrow £1,600 for purposes of sewerage and street improvement. Mr. Cousens, engineer to the local board, explained the scheme which he had prepared.

On Saturday the stonemasons, builders, painters, and braziers who have been engaged under Mr. S. Sherwin, of Boston, builder and contractor, in restoring Boston parish church were entertained at supper by the churchwardens at the Red Cow Hotel, about forty persons being present. The restoration has been carried out at about £800.

During the present week the scaffolding has been struck from the fine spire and tower just added to the Church of St. John the Divine, Vassall-road, Kennington, revealing their fine proportions. The church is one of the late Mr. G. E. Street's, and the completion has been carried out under the direction of his son, Mr. Arthur E. Street, M.A. The tower and spire rise to a total height of 212ft., being only surpassed in height in South London by the spire of the Lincoln Tower at Christchurch, Westminster Bridge-road, which is 220ft. from ground to vane. We illustrated St. John's spire on the 28th September last.

The new cathedral at Perth, Western Australia, was consecrated on All Saints' Day. Its architect was the late Mr. Blackett, of Sydney. It is cruciform in plan, 158ft. by 96ft. (at the transepts), and 70ft. in height to the apex of the nave roof; it will accommodate over 1,000 worshippers. It is a red brick building, with stone arches, jambs, &c., in First Pointed Gothic. The tower is to be surmounted by a spire; a chapter house and other features remain to be added.

## Trade News.

### WAGES MOVEMENTS.

THE BLUE-BRICK TRADE.—A meeting of the blue-brick makers of South Staffordshire, Warwickshire, and Worcestershire was held at Birmingham on the 20th inst. Mr. Putress presided; and among the firms represented were the Haunchwood Brick Company (Nuneaton), Hathern Brick Company (Loughborough), H. Doulton and Co. (Rowley), Wood and Ivory, Limited (West Bromwich), Ketley Brick Company (King's Norton), Barrows and Barrows (Great Bridge), Hookley Hall Brick Company, Limited (Tamworth), Roberts and Cooper (Brierley Hill), Stanley Brothers (Nuneaton), W. Morris (Oldbury), Partridge and Guest (Rowley), J. W. Howlett (Oldbury), Cakemore Brick Company (Rowley), S. J. Sadler (Oldbury), P. and S. Wood (Tipton), and J. Whitehouse. Mr. Webster (Messrs. Wood and Ivory) was appointed hon. sec. The chairman said that a circular had been sent out to all the blue-brick makers. He thought they were all agreed that prices were too low.—Mr. Rogers (Messrs. Stanley Bros.) said he thought the present time was a good one for advancing prices. In the Warwickshire district the price of fuel had increased 25 per cent., and consequently makers could not afford to sell at the old prices. There was a movement apparent for a general advance of prices.—Mr. Aglow (S. J. Sadler) said his firm was quite anxious for an advance to take place; but in the past, after it had been decided to advance prices, they found some of their neighbours underselling them.—Mr. Hudson (Loughborough) said their trade had been damaged by the middlemen, who had affected the increase in prices. The question he asked was whether any of them were making a profit after receiving 5 per cent. for the money invested in their works? He thought if the blue-brick makers would strike, it would have the effect of sending up prices.—Mr. Webster, Mr. Hamblett, and Mr. J. W. Howlett supported the proposition for an advance.—The chairman suggested that they might make an advance of 10 per cent. on best bricks, 20 per cent. on odd-side stuff, and 5 per cent. on common bricks.—On the motion of the chairman, seconded by Mr. Whitehouse, the following resolution was passed:—"That this meeting, comprising the principal blue-brick makers of South Staffordshire, Warwickshire, and Worcestershire, hereby unanimously agree to advance the price of blue bricks 10 per cent., such advance being entirely due to the increase in the price of fuel and other material."—An amendment, proposing to refer the question to a committee to draw up a minimum list of prices, was rejected.

EDINBURGH AND LEITH.—A general meeting of the operative masons in Edinburgh was held on Thursday night, the 20th inst.—Mr. W. Dall in the chair—to consider the terms of an agreement, lately adjusted at a conference of an equal number of employers and operatives, which proposes that on and after 1st March next a uniform rate of wages at 7d. per hour should be paid for work in Edinburgh and Leith for the following twelve months. The various clauses were discussed *seriatim*, and agreed to by a large majority. About 1,400 men will be affected by this agreement, which it is hoped will be beneficial alike to employers and men. The former will be enabled to contract for work with more certainty, and the latter will benefit especially in the back of the year when trade gets slack. The following are the main clauses of the agreement:—"That this agreement be for one year from and after 1st March, 1889. During its currency the general rate of wages in Edinburgh and Leith for competent workmen, both builders and hewers, shall be 7d. per hour. To secure enforcement of the agreement all cases of violation shall be dealt with, first, by the respective associations; and second, a joint committee of the employers and operatives shall deal with cases remitted to them. Any combination of workmen leaving an employer who may be paying the uniform rate shall be regarded as a violation of this agreement, and shall be dealt with by the Operatives' Association. Employers, even in cases of urgency, shall not be at liberty to make any advance on this general rate until satisfactory reasons for so doing have been submitted to the Builders' Association. Those violating this regulation shall be dealt with as the joint committee may advise. That three months' notice shall be given prior to the 1st March, 1890, of any alterations in the terms of this agreement proposed to be made on behalf of either employers or operatives. The average wage at the present time is 6½d. an hour."

A workhouse chapel at Rochester was formally dedicated by the Bishop of the See on Tuesday week. It is faced with red bricks, and has been built by Mr. C. E. Skinner, of Caatham, from designs by Mr. J. Drake, of Rochester.























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